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Games&Decisions

Ewa WIĘCEK-JANKA

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Preface

The subject of present elaboration is managerial games and decisive processes. Issues of solving problems, selection of methods, techniques and rules of making decisions in conditions of economical activity, but also in private life, constitute an important element for creating a competitive advantage – both personal and enterprise; especially in the rapidly changing market of products, services and ideas.

Present publication results from scientific and research works concerning the use of marketing games as an instrument that shapes skills of making decisions. This book constitutes a summary of both theoretical deliberations and literature and empirical research.

This publication is mostly directed to those, who want to now better the problem of a decisive process in management. The presented approach is adequate both to decisions made one time and system approach to decisive processes. The elaboration presents a decisive process not only from the point of view of management, but also from a psychological and sociological perspective; therefore the group of potential readers is rather big.

The book contains six chapters. The first chapter – *Decisive problems in enterprise* – presents principle terms related with decisions, factors that condition the character of a decision, as well as models and techniques of making decisions. The second chapter – *Problems in the decision making* – illustrates objective and subjective barriers in the process of making decisions, the role of a manager in this process, as well as the influence of incertitude and risk on efficiency of decisions. Third chapter – *Support of decisions* – includes a characteristic of systems supporting the process of making decisions and the deliberation of principles of the "game theory". The fourth chapter – *Decisive processes and games* – presents the typology of games. The fifth chapter – *Psychology in simulation games* – shows particular elements of psychology used in managerial games. The sixth chapter illustrates individual games that are used in the process of education in the Poznan University of Technology.

The author aims at writing a book that is possibly friendly for a student-reader, which has a synthetic form but presenting the variety of aspects of the undertaken subject. Managers, tutors, lecturers and trainers in organizations should find in this book some useful information that might at least partially satisfy their needs. Let's leave the reader to evaluate whether this attempt succeeded.

Ewa Więcek-Janka

Chapter 1
Problems, decisions, making decisions

Introduction

Making decisions is an integral and most important element in the process of management. A skillful selection of techniques for evaluating decisive problems, as well as variants of their solutions is a key element for achieving success and competitiveness in both individual and enterprise's area. The first chapter presents opinions of scientists, which include types of problems and decisions, their classification and the course of the process of making a decision.

1.1. Decisive problem

1.1.1. Types of problems in enterprises

Problems appear in an enterprise as often, as decisions that must be undertaken for solving an appearing problem. So, problems, as well as decisions are an inseparable part of every function realized in the company. Their occurrence is generally and closely connected with development of man, society, organization and enterprises.

> *In management science the problem is treated as a task that man isn't able or doesn't have the skill for explaining it with use of knowledge he has and so he must work out a new, original solution.*

The occurrence of problems itself doesn't lead to development, however solving problems and making optimum decisions does. Meanwhile, incorrect solution of a problem most often leads to accretion of new, more difficult problems.

A manager, who faces a situation with a problem, should apply following steps[1]:

- Perceiving the problem – the subject observes the situation and notices the problem in it;
- Analysis of situation of the problem – acceptance and preliminary distinction of problematic information;
- Verification of ideas – evaluation of potential solutions.

[1] Kozielecki J., *Psychologiczna teoria decyzji [Psychological theory of the decision],* Państwowe Wydawnictwo Naukowe, Warszawa 1975, p. 15.

> Problematic situation *is a term that should be interpreted as a situation that requires a solution. It can be determined as a dynamic configuration of interaction between a manager and workers and the environment; in a limited range of operation.*

Nosal determines a problematic situation as an integration of the mind of man with conditions occurring in the environment, perceiving both domains of interaction as inseparable[2]:

- Stimulus, signals and information structures included in the impact of the environment,
- Notional thinking aiming in categorization of influences, formulating reactions and goals of operation.

Both in the enterprise and in the family as well as in any human group talking about the problem starts when a threat of the achievement of the goals identified as danger appears or when possibilities of better solutions identified as new chances appear.

> *Problem is every group of conditions and barriers that can severely reduce the efficiency of operation of an enterprise, which solving or minimizing is in competence of managers.*

The main task of managers from different levels of management is identifying problems, their causes and consequences of potential non-solving them or of postponing solving in time.

A manager can encounter different problems in the organizations management process. Most often identified ones are as follows[3]:

- Orientation problems – situation, in which the manager is forced to produce or to find the determined information necessary in the process of company management;
- Decisive problems – situation, in which the purpose is to make the right decision, i.e. the choice of the method of acting from the set of alternative ways.
- Executive problems – situation in which the manager is forced to change the mental flow drawn up earlier for the realization of specific objectives of the organization.

---

[2] Nosal Cz., *Umysł menedżera. Problemy – decyzje – strategie [Mind of the manager. Problems – decisions – strategies]*, Wrocław 1993, p. 60.

[3] Warecki M., Warecki W., *Decyzje nasze codzienne {Our everyday decisions]*, Solidarność, nr 15, 11 kwietnia 2008.

Other classification of problems was described in the table 1.1, which is relying on the analysis of factors participating in the problem situation, and refers for finding the answer to questions[4]:

- On which level of management problems are being solved?
- Are issues basic or maybe they are symptoms of other problems? Is there a chance for solving the issue in the enterprise, will be the cooperation with other subjects necessary?
- Which division is responsible for solving those problems (supply, production, marketing, etc.)?
- What cost of solving a problem compared with consequences resulting from the resignation from solving them will be?

Table 1.1. Classification of problems

Criterion	Problems	Characteristics of the problem
complexity	simple	Having operating character, solving them isn't complicated or laborious, it isn't expensive. It doesn't require the large quantity of information. These problems are current and recurrent.
	compound	Their character refers to the whole company. They are time-consuming and complicated in terms of necessary resources for solving them. They require the access to information concerning various domains and serious financial outlays. These problems are essential and fundamental.
	very compound	They contain many variables, they require long time for drawing the solution up as well as the skill to foresee in time what conditions the problem will be solved in the future. These problems are exceptional and extraordinary.
character of the problem	deviant	They are appearing as an effect of defects at action of the organization, it is often difficult to find causes of such problems. The majority of energy is directed on localization of the causes of appearance of particular problem.

[4] Penc J., *Decyzje w zarządzaniu [Decisions in management]*, Wydawnictwo Profesjonalnej Szkoły Biznesu, Kraków 1997, p. 92-94.

	optimization	They occur in result of implemented changes that have an adaptive or modificative character connected with the internal acceptance of determined change or with external limitation[5]. They are connected with improving or the modernization of the management organization in diverse spheres of action.
	innovative	They are determined by innovative changes In the environment. Seeking the innovation, generating new solutions is becoming the imperative of acting for enterprises in the High-Tech economy.
degree of risk	In conditions of certitude	we can determine consequences
	In conditions of risk	with the certain plausibility of occurrence
	In conditions of incertitude	neither the consequence nor the probability
degree of being innovative	routine	
	adaptive	experiencing to new conditions
	innovative	there is no experience
	regressive	return to former solutions
degree of potential for being programmable	programmed	
	not-programmed	
degree of the subjective commitment	single	taken based on experience and the individual knowledge associated with responsibility for the implementation of the decision
	single based on the collective diagnosis	taken in situations requiring specialist consultation and contacts with experts
	collective	based on democratic concomitance principles, alternatives resulting from discussion and the negotiation

Personal elaboration

Managing in changeable market environment requires from managers making decision with use of flexible methods. In situations of a limited resource of time at their disposal managers are forced to take independent decisions. It most often concerns routine or executive decisions devoid of uncertainties, with the little degree of risk. The table 1.2 presents strong and weak parts of the individual decision making process.

[5] Więcek-Janka E., *Zmiany i konflikty w organizacji [Changes and conflicts in the organization]*, Wydawnictwo Politechniki Poznańskiej, Poznań 2006.

Table 1.2. Strong and weak parts of the individual decision making process

Strong parts	Weak parts
Stronger sense of responsibility of the decision maker (the responsibility is not dispersed); unity of entitlements and liabilities; higher speed of the decision making; smaller direct costs of decision-making processes; bigger possibility of making a decision in difficult and unpopular issues; less "corrupt decisions"	Generally worse essential preparation; Smaller engagement of executors; Possibility of expensiveneses as result of bad decisions; Bigger possibility of lawlessness and abusive actions of decision makers.

Personal elaboration

Managers support their process of making innovative decisions with a significant range of complexity by consulting them with experts and by creating decisive groups constituted from experts from particular domain if only they face situation of incertitude or high risk. The table 1.3 presents selected strong and weak parts of a collective decision making.

Table 1.3. Strong and weak sides of collective making decisions

Strong parts	Weak parts
possibility of revealing a number of interesting and valuable ideas; Better flow of information; Bigger engagement In further realization; Shaping relations between the group and its leader based more on partnership.	danger of the appearance of „gregarious thinking"; tendency to exaggerated risk; extention of time of the process of making decision (proportional to the number, differences of tasks and interests in the group); danger of exaggerated exhibition of group interests and "coteries".

Personal elaboration

Concentration of proper information has a prior meaning for understanding the problem[6]. In the face of the new problem exercising knowledge already being in possession is very important.

[6] Warecki M., Warecki W., *Decyzje nasze codzienne [Our everyday decisions]*, Solidarność, nr 15, 11 kwietnia 2008.

1.1.2. Analysis of the problem situation

Understanding the problem is a crucial moment for the process of solving it. It is manifesting itself with applying structures of decoding the situation of the problem and converting it into notions intelligible for those, who solve a problem.

> *Understanding the problem means producing its logical intellectual representation. These representatives can contain symbols and notions, so as algebraic symbols or words. It can contain also enumerated and graphical visualization.*

Effective understanding the problem usually requires fulfilling 3 conditions[7]:

1. Individual parts for the intellectual representation of the problem should be connected with themselves in the sensible way.
2. Individual elements of intellectual representatives should correspond to these elements of the problem which are found in real world. Elements for our intellectual representation must contain the essential information for understanding the problem. For solving the problem we must prepare by getting acquainted with its elements possibly brightly presenting the purpose at which we aim.
3. The mind stores a certain general knowledge that can be used for solving the problem. Moreover, a wide knowledge enables classifying the problem and finding a correspondent analogy for it.

Figure 1.1 presents the scheme of the analysis of the problem.

Proper conducting the process of the problem analysis with the identification of causes and effects is fundamental to their rational solution. Similarly a personality, experience and the knowledge of the manager are important for the success in the problem solving. However, there are situations, in which solving a problem is entrusted exclusively to experience, the premonition or the common sense of the manager. This way (although it is applied most often) can turn out to be unreliable, especially in the dynamic market environment. Requirements of customers, conditions of the market, severe competition influence on appearance of diverse problems in individual phases of the lifecycle of the enterprise (organization).

The company life cycle is describing functioning of the enterprise according to the determined order of events. The end of one phase is initiating next. The figure 1.2 presents seven stages of a life cycle of an enterprise.

[7] Kozielecki J., Psychologiczna teoria decyzji [Psychological theory of the decision], Państwowe Wydawnictwo Naukowe, Warszawa 1975, p. 17.

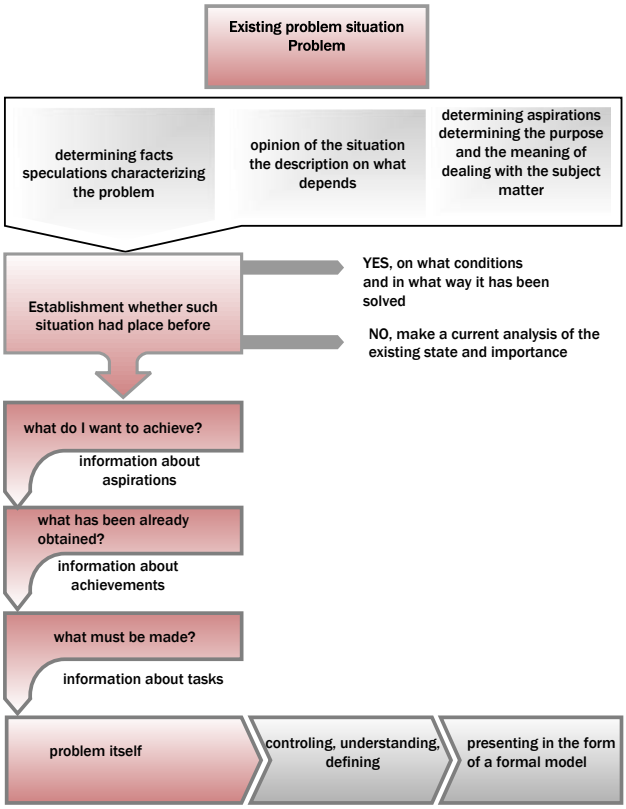

Figure 1.1. Outline of the problem analysis. Personal elaboration

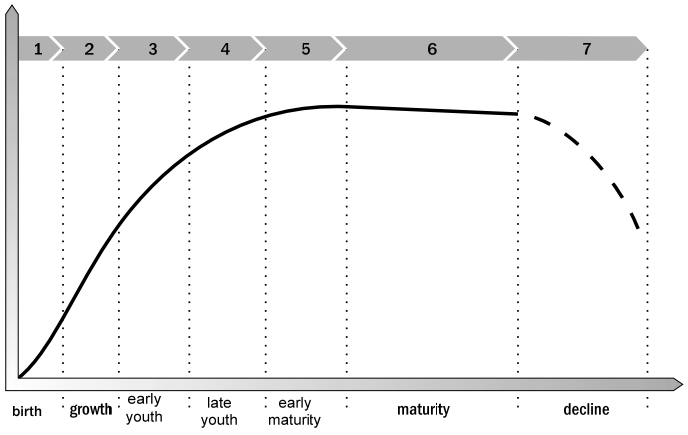

Figure 1.2. Company (organization) life cycle. Personal elaboration

An ability to accumulate the knowledge and experience ranks among distinctive features of consecutive phases of the model of the lifecycle. It means that the organization is entering the next phase richer with experience and new abilities of employees. This is a guarantee of its development. However it doesn't mean that company managers will not encounter problems. Just the opposite, every development phase is bringing the number of diverse problems with different intensity and level of complicating. Most often met problems in the company life cycle were presented in the table 1.4.

Table 1.4. Classification of problems occurring in the life cycle of the organization

Stage	Problems	Results – solved problem		Necessary knowledge
		correct	**incorrect**	
Birth	Form a new organization	The new company starts to operate	The ides stays in the area of dreams; the enterprise is underinvested	Determining the vision; noticing long-term problems
Growth	Survive as a system	The organization is accepting the reality and it is releasing energy	The organization is not accepting the situation on the market. It is being marginalized or dismissed	Realization of operational and tactic objectives
Early youth	Gaining stabilization	The organization is becoming strong and efficient, it is keeping the elasticity	The organization fights for its survival and shapes rules that block the flexible activity	Creating operational plans, seeking innovative strategies
Late youth	Gaining reputation	Proper image of the company requires upgrading efficiency and quality of operating	The organization focuses on creating its image, which doesn't have covering in the quality	Preparing plans of delegating authorities
Maturity	Working out the exceptional character of the organization	Using worked possibilities	Too narrow specialization which is forcing managers to seek other markets	Design teams' management

Late maturity	Activity for the society	The organization gains respect of the society	The organization isn't integrating purposes of the company with social objectives	Integration of objectives of the organization with social objectives
Decadence	Withdrawing from the market	Sale of the company	Closing of the company	Noticing chances for transformation

Prepared on basis of Penc 1997, p. 96-97

Fading a problem, a company may ask questions, which answering enable systemizing the problem and identifying the situation in which the problem appears. Those are steps with following questions:

- Presenting (defining) the problem.
  - Is the present cognitive situation a problem?
  - What type of problem it concerns?
  - When did the problem appear and what is its range?
- Determining potential causes and analysis of the situation
  - What the given problem differs in from other, similar ones?
  - In what sphere the problem is appearing and did the company face earlier similar issues?
- Evaluation of costs of behaviors In problematic situation
  - What input of energy is necessary for solving the problem?
  - What will be the (financial) burden of solving the problem In relation to the option of not solving it?
- Determining priorities In the current activity of the company
  - Can the problem solve itself?
  - How low can be inputs of assets in solving the problem?
- Evaluation of possibilities of solving the problem
  - How many potential solutions does the problem have?
  - Which manager is competent for solving the problem?
  - Which consulting enterprise can help in solving the problem?

Getting replies to posed questions allows for conducting optimized action included in five stages: preparation; collecting ideas (information); determining variants; distinguishing realistic variants; choosing the solution. The scheme of solving the problem is presented on the figure 1.3.

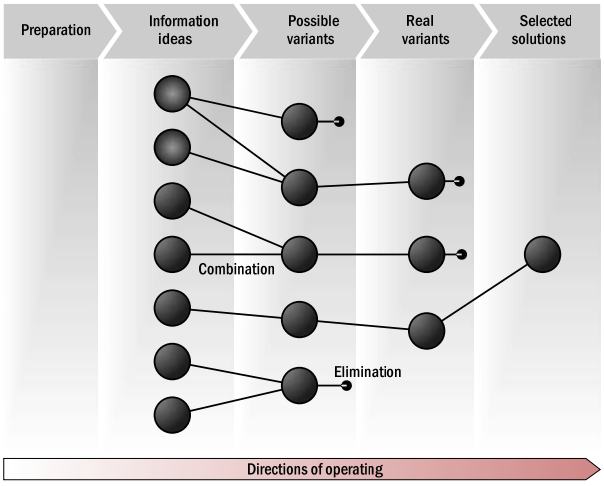

Figure 1.3. The scheme of solving the problem. Personal elaboration

1.2. Term and types of decisions

1.2.1. Fundamental terms

Deciding is an everyday and universal activity, made in the constant way. It is deciding about basic and universal values of every man, like the freedom of choice, or also a form of manifesting itself of his activity and expressing the individual value.

In every contemporary organization processes of deciding constitute fundamental and undoubtedly important component of the management of human resources and financial assets, aiming at achieving targets standing before the organization. The literature of the subject of management enumerate multiple terms claiming that:

> *Management is a sequential, multistage decision making process*.

Mikołajczyk determines it in a similar way, writing that „managing an organization is brought up to a constant making managerial decisions, from which the part related with everyday functioning has a highly rutinized character. However, another part is resulting from situations and changes that have been presented earlier

and which have place in the environment and inside organization"[8]. If it is possible to assume that management is a process of making decisions consisting a certain sequence of decisions realized in a determined time and range, we might ask what would his deciding and decision be? According to Zieleniewski: „deciding is making a non-random choice during action. The decision is a result of deciding"[9]. Although Koźmiński[10] claims that: „it has been accepted to perceive any conscious (non-random) choice of one from recognized and accepted as realistic variants of future action as a decision". However Pszczołowski[11] defines the idea of decision as „an internal action which is a free choice of one of possible future behaviors. A decision is resulting from a process of deciding, which is a process of transposing intentions into objectives". According to Rudniański[12] „a decision is a choice of one action from the range of potential operations that are realizable in particular moment [...] or consciously restraining from making a choice..."

The literature on the subject is placing the term of „deciding" in the sphere of psychological and sociological science, which are the main ones that treat about human's behavior.

> ***Deciding*** *is one of types of man's behavior;*
> ***Decision*** *is a choice made by man, which concerns future actions, in result of it man initiates a particular activity,(a particular aesthetic choice is not a decision, if it doesn't give results in action);*
> ***Decision*** *is only a non-random choice, which is based on criterions that have been consciously accepted.*

For the practice of management most important are managerial decisions. Managerial decisions differ from other ones because they are related with realization of fundamental function of management (planning, organizing, motivating and controlling). The figure 1.4 presents a system of conjugated decisions.

---

[8] Mikołajczyk. Z., *Techniki organizatorskie w rozwiązywaniu problemów zarządzania [Techniques of organization in solving problem sof management]*, PWN Wydawnictwo naukowe, Warszawa 2001, p. 4.

[9] Zieleniewski J., *Organizacja zespołów ludzkich [Organization of human teams]*, PWN, Warszawa 1978.

[10] Koźmiński A.K., Piotrowski W., *Zarządzanie. Teoria i praktyka [Management. Theory and practice]*, PWN Wydawnictwo Naukowe, Warszawa 2002.

[11] Pszczołowski T., *Mała Encyklopedia Prakseologii i Teorii organizacji [Littre Encyclopedia of the Praxeology and the theory of organization]*, Zakład Narodowy im. Ossolińskich , 1978.

[12] Rudniański J., *Przed decyzją [Before the decision]*, Państwowe Zakłady Wydawnictw Szkolnych, Warszawa 1965.

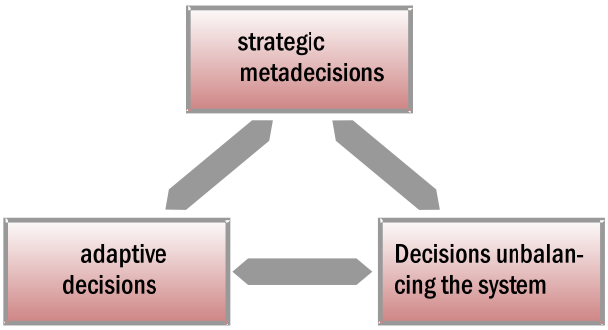

Figure 1.4. A system of conjugated decisions. prepared on basis of: Koźmiński 1979, p. 26

Another difference of making such decisions is referring them to objectives and methods of acting of the person that makes such decision and, in proper hierarchy, to other persons as well.

> ***Managerial decisions*** *are made with taking under consideration the fact that they will be realized by other persons that those, who have made them*.

1.2.2. Classification of managerial decisions

Managerial decisions can be classified in reference to their essential content concerning areas of the enterprise and can be treated as a sequence of actions aimed in realization of objectives.

> *Managing organization is being brought up to constant* ***making managerial decisions****, from which a part that concerns everyday activities has a highly rutinized character. However another part is resulting from situations and changes that have been presented earlier and which have place in the environment and inside the organization.*

Among them it is possible to distinguish *alocative* decisions, which concern managing labor means and financial assets; *personal*, referring to human resource management (policy of employment, training, motivating, etc.) and *administrative*, which concern formal actions in the enterprise that are connected with the internal policy of the company, its legal and economical environment.

The time horizon of their influence can be another criterion for classifying decisions. According to it there can be distinguished *strategic* decisions, which determine basic directions for actions of the organization realized in the perspective of

several or several dozen years. *Tactic* decisions, for medium term, concern particular ways of realization of selected strategy in individual Romains and particular time (most often it concerns 3 years perspective). *Operational* decisions concern current problems of functioning of the organization[13].

Managerial decision can be classified with regard to the person of the manager (mainly his knowledge, skills and experience). We can point at occurrence of *rutinized* decisions, which are made in repeating conditions of work, as well as non-rutinized (exceptional) ones. Other division is related with the decisive situation and with skills of managers; it divides decisions into *difficult*, which consequences (in case of loss) can directly affect the welfare of the manager and *easy*, which consequences will not be vexing in any way. Difficult decisions are related with appearance of a psychological stress, which is all the higher, the greater is the risk of negative consequences of decisions that have been made[14].

Depending on the number of identified variables that affect the process of making decisions and which are important for the decision maker, we can distinguish simple decisions and complex decisions. *Simple* decisions often concern repeatable and standardized actions performed by persons on workstations. *Complex* decisions concern organizing the decisive process and they depend from actions and decisions made in other sections of the organization[15].

Decisions taken rarely in the enterprise can be regarded as invariable. Changing environment of the company forces out modifying and changes of decisions, even of strategic ones. Taking under consideration the resistance for the changeability of the environment, it is possible to distinguish static and dynamic decisions.

If we observe a finite number of possibilities of affecting, we call it *closed* decisions; in other case decisions are *opened*.

The table 1.5. illustrates the classification of managerial decisions.

Table 1.5. Classification of managerial decisions

criterion	decisions
Essential	alocative, personal, administrative
Function in the enterprise	production, sale, marketing
Planning	strategic, tactic, operational
Person of the manager	rutinized, exceptional
Influence of the environment	simple, complex; static, dynamic
Evaluation of information	ex ante, ex post

Personal elaboration

[13] Koźmiński A.K., Piotrowski W., *Zarządzanie. Teoria i praktyka [Management, Theory and practice]*, PWN Wydawnictwo Naukowe, Warszawa 2002.
[14] Ibid.
[15] Ibid.

In enterprises, in which dependencies between the firm and its environment have a strategic character and where it is possible to observe a high number of relations between cells of the organizational structure decisions from different time and various positions link with themselves. It is difficult to identify all consequences of decisions that have been made *ex ante*, this is why all composite and complex evaluations are being made *ex post*. Such approach allows minimizing losses resulting from decisions based on false data, the company can gain a new knowledge resulting from analyses of effects of decisions that have been made in the past. The classification of decision from the point of view of the formal structure is presented in the figure 1.5.

Functions of the formal structure	Elements of the formal structure		
	division of tasks	division of power	division of assets
Acquiring resources	Strategic decisions		
Resource allocation	Alocative decisions		
Integration of processes	Coordinative decisions		
Motivating and and organizing			

Figure 1.5. Classification of decisions from the point of view of the formal structure. Personal elaboration

The competitiveness of the enterprise on the market requires from managers to make optimum decisions. A decision can be called optimum if following conditions are being fulfilled[16]:

- It is possible to compare the whole of consequences of all possible variants of decisions (it concerns on getting them all to measurable individuals, like for example to money);
- It is possible to make an ambiguous expression of functions carried out in the same units;
- There exists a variant of a decision, which maximizes or minimizes the determined criterion.

Decisions must be taken in accurate time so that they would bring expected benefits; it means that if there are certain dependencies between the enterprise and its environment or before their predicted occurrence. It is required that the decision

[16] Koźmiński A.K., *Decyzje. Analiza systemowa organizacji [Decisions. Systems analysis of the organization]*, Wydawnictwo Naukowe PWN, Warszawa 1979.

would be efficient and effective, i.e. that in existing organizational and legal limits it would provide a dynamic balance between the company and its environment, development of the potential and optimum economic effects. It means that decisions can't be made only on basis of sense and intuition, they must be well considered and prepared with use of scientific methods and approaches applied in processes of making decisions. So, decisions should result from a decisive process, which is securing the rationality of decisions.

> ***Rational decisions*** *should result from a decisive process that encloses a set of mental operations logically connected and organized in a proper order, which enable correct evaluation of the decisive, determining conditions for solving the problem, as well as selection of the most beneficent variant*[17].

1.3. Decision making process

1.3.1. Decision making – action, process, system

Incorrect design of decisive processes can be often an unnoticeable cause of the restraint of the company's development. For example, there appear some inconveniences or/and incompatibilities of the range between duties, authorities and responsibilities.

> ***Decisive process*** *means combining the process of preparation of alternative variants of the decision and a process of making selection of one of those variant for further realization.*

Lack of the project of decision-making processes in the organization means the lack of following things: determining key decisions, ways of making them, aligning it with the existing organizational structure or with mechanisms supporting the organization[18]. The basic decision making process is presented in the figure 1.6.

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[17] Penc J., *Decyzje w zarządzaniu [Decisions in management]*, Wydawnictwo Profesjonalnej Szkoły Biznesu, Kraków 1997, quoted page 128.

[18] Gadiesh O., Olivet S., *Projektowanie pod kątem możliwości realizacji [Designing in respect to possibilities of realization],* w: *Organizacja przyszłości*, ed. F. Hesselbein, M. Goldsmith, R. Beckhard, Business Press, Warszawa, 1998, p. 78.

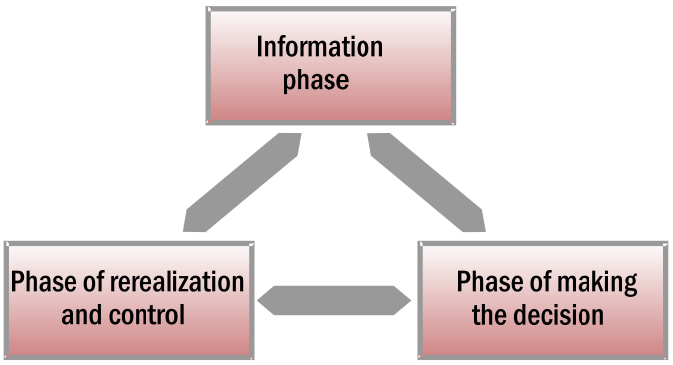

Figure 1.6. Basic decision making process. Prepared on basis of: Kozielecki, 1978, p. 32

Drawing up the optimum and effective decision-making process in the problem solving is consisting two phases. The first one concern preparing the decisive process, which includes following activities[19]:

– Recognizing and describing the problem that requires making a decision, including determining the range of the problem, areas of activity it relates to and competent people in the subject the problem concerns;

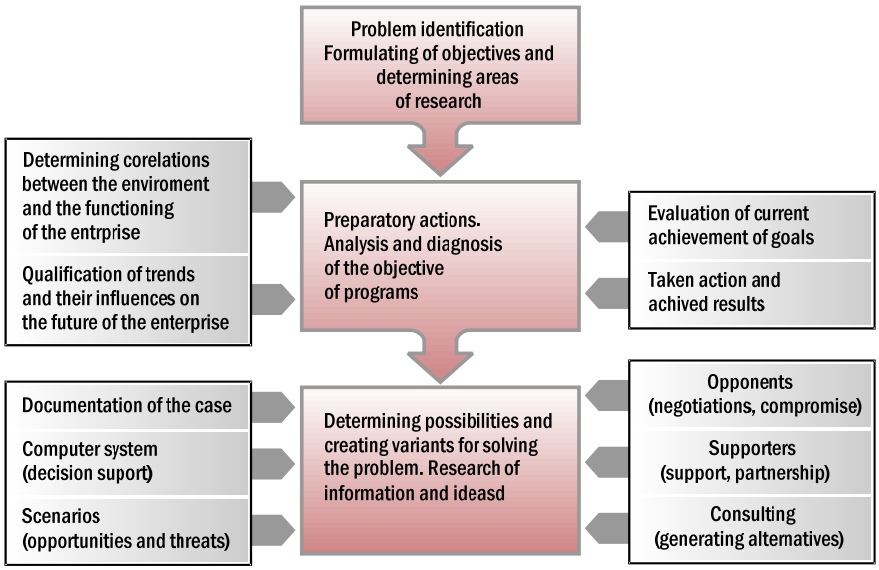
Problem identification
Formulating of objectives and determining areas of research
Determining corelations between the enviroment and the functioning of the entrprise
Qualification of trends and their influences on the future of the enterprise
Preparatory actions. Analysis and diagnosis of the objective of programs
Evaluation of current achievement of goals
Taken action and achived results
Documentation of the case
Computer system (decision suport)
Scenarios (opportunities and threats)
Determining possibilities and creating variants for solving the problem. Research of information and ideasd
Opponents (negotiations, compromise)
Supporters (support, partnership)
Consulting (generating alternatives)

Figure 1.7. Preparation of decisive process. Personal elaboration

[19] Penc J., *Decyzje w zarządzaniu {Decisions in management]*, Wydawnictwo Profesjonalnej Szkoły Biznesu, Kraków 1997, p. 135.

– Collecting information about the problem and methods of solving it;
– Determining circumstances that must be considered so that the solution would be correct;
– Collecting opinions of experts;
– Preparing a diagnosis of a situation that would consist evaluation of economical, technical and organizational possibilities of solving the problem;
– Shaping alternative solutions for the analyzed problem that would be considered as acceptable for the company.

The figure 1.7 illustrates the course of the first phase of the decisive process: preparation.

The next phase in the decisive process is realization of the decision. Following elements are being realized in this phase[20]:

– discussion of employed persons on choice about an optimal solution;
– choice of rules of the evaluation of variants prepared in the earlier phase;
– selecting the optimum solution and justifying it;
– making a decision and providing conditions of its realization;
– guaranteeing feedbacks confirming (yes or no) the accuracy and the effectiveness of the taken decision.

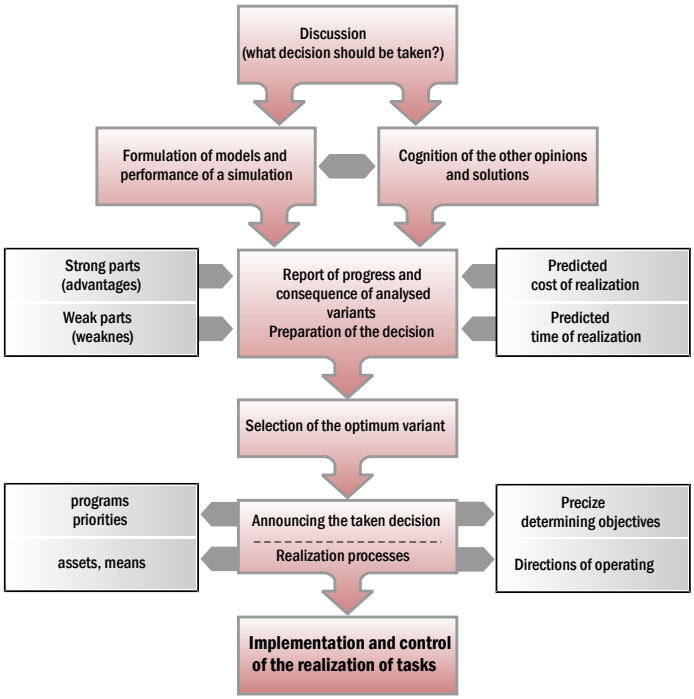
Discussion
(what decision should be taken?)
Formulation of models and performance of a simulation
Cognition of the other opinions and solutions
Strong parts (advantages)
Weak parts (weaknes)
Report of progress and consequence of analysed variants
Preparation of the decision
Predicted cost of realization
Predicted time of realization
Selection of the optimum variant
programs priorities
assets, means
Announcing the taken decision
Realization processes
Precize determining objectives
Directions of operating
Implementation and control of the realization of tasks

Figure 1.8. Decisive process. Personal elaboration

[20] Ibid.

The figure 1.8 presents the course of the phase of making the decision. Authors are describing other, wider approaches to the process of making decisions. They claim that next to methods that have been presented earlier, phases of preparation and realization of the decisive process, it is necessary to add to the description variables that were not been taken under consideration before.

Such complement gives a system perspective to the problem. Author has assumed that each decisive process brings a certain asset of knowledge to the organization and that can affect positively or negatively to the process of making decisions. Positive aspects of the impact of the new knowledge are as follows:

– building experience, based on the open and tacit knowledge as well as the increase of competence and abilities of managers;
– selective gathering and analyzing internal and external information that will be helpful in processes of making decisions;
– upgrading competences of managers, using resources of the personality and intuition of people engaged in decisive processes.

Negative aspects of the impact of the new knowledge to the course of the decisive process are related with incertitude and risk, which affect on:

– abating the evaluation of the current experience;
– devaluation of the opened and tacit knowledge possessed by the company;
– decrease of specialist skills owed by the firm;
- reduction of abilities of analysis of internal and external information;
– resignation of use of intuitive methods.

The system approach of the process of making decision is illustrated in the figure 1.9.

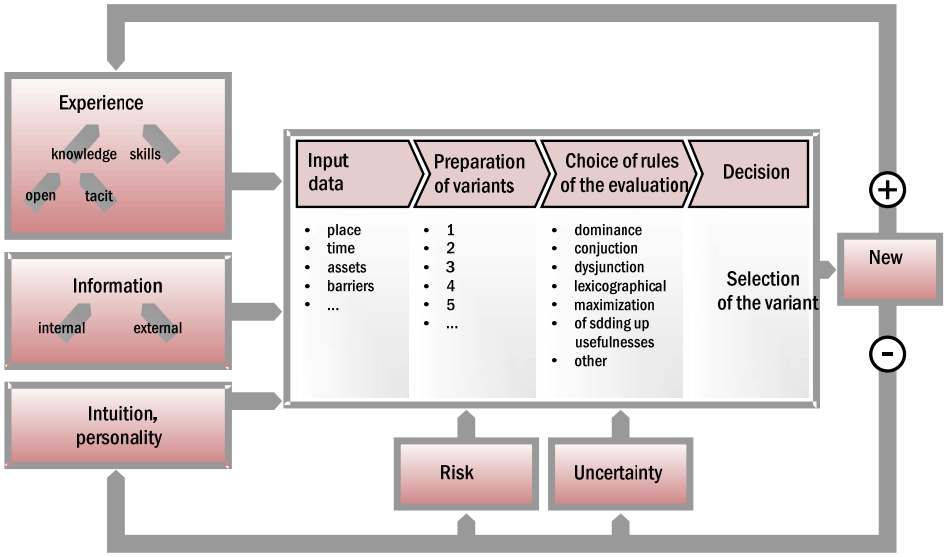

Figure 1.9. System of making decisions. Personal elaboration

1.3.2. Decision-making rules

The act of selection of decision-making rules is a very important aspect in the decision making process. Determined rule in a certain time benefits one solution and discriminates another; therefore it is so important to select them wisely.

„Natural decision-making rules" are the most commonly used in everyday life. Those are rules used spontaneously and they serve for integrating partial evaluations. A set of such rules encloses[21]:

Rule of domination. It is the simplest rule and therefore it is use most often. It enables gaining a contrast decisive situation and it doesn't burden to much mental assets and it provides a constant operational reserve. The result of application of the rule of domination is loaded with a relatively small post-decisive dissonance. The rule of domination is saying:

> *Choose the variant that is more beneficent than other, taking under consideration* ***at least one characteristic****, and which is not worse in terms of all remaining features.*

Rule of conjunction facilitates making delicate decisions – if the decision-maker applies this rule, he most probably recognized the decision as very risky, as a multidimensional problem requiring analytical thinking. It is putting quite great requirements for the mind of the decision-maker and it is leading action to very sharp selection of variants. The rule of conjunction is recommending:

> *Choose the variant, in which* ***all evaluated characteristics*** *are reaching or crossing assumed critical thresholds*

Limits for each criterion are determined individually. The value of the threshold should depend on the objective variable (probability distribution) in particular scale. The decision-maker should try to form quantitative criteria instead of qualitative ones.

The rule of disjunction is the contrast of the rule of conjunction. It in this case decision-maker takes under attention one, the most distinguishing feature and takes it under evaluation. He usually chooses the most contrasted variant. Such solution is useful in everyday, repeatable and rutinized activities; hence, in atypical situations it leads to mistakes.

> ***The rule of disjunction is formulating action as follows:*** *choose this variant, in which at least one of assessed features is crossing or is reaching the assumed critical threshold*

[21] Penc J., *Decyzje w zarządzaniu [Decisions in management]*, Wydawnictwo Profesjonalnej Szkoły Biznesu, Kraków 1997, p. 136.

The lexicographical rule concerns creating a hierarchic order in the set of criteria, which would settle them in order to their validity. There is no need to make detailed analysis of decisions' makers' preferences for routine decisions. However, a form of thinking that hierarchy's criteria, as well as variants of decisions occurs in complicated situations. Use of this rule solves problem incoherence in structure of preference, and it arranges inventive.

> ***The lexicographical rule is recommending:*** *choose the variant that is more beneficial in terms of the most important feature. Repeat this procedure, taking a hierarchy of importance of features into consideration*

The next from the whole group of rules is *the rule of elimination*, which facilitates reducing the set of variants when their number is too big and implementation of this rule reduces the range of information that must be processed. It should be applied in simple situations, where it can give optimum decisions.

> ***The rule of elimination presents itself as follows:*** *Reject all variants, which on marking scales for specific features didn't achieve the assumed critical threshold. Repeat this procedure, taking the hierarchy of features into consideration*

It in similar cases was can apply the *rule of maximization,* which is:

> ***Rule of maximization:*** *From two variants choose the one, which is reweighing in terms of the number of beneficial features, for every pair of variants give numbers attesting to the majority of determined variants*

The rule of accumulating usefulness (maximization of subjective usefulness) is the last rule described in this elaboration. Determined rule has many variants. It requires that decision-makers define weights for the usefulness of applied criteria, probability distribution, etc. This rule is accurate and applied only in case of narrow class of situation.

> ***The rule of accumulating usefulness sounds as follows:*** *choose the variant, which reached a large sum of the weighed usefulness evaluated for all features*

1.3.3. Models of the decision-making and decision-making techniques

Decision-making processes apply a range of supporting methods and techniques based on fundamental theories[22].

The theory of rational decisive model is an ideal concept based on an assumption that the decision-maker operates in a logic and purposeful way and that he dispose all knowledge that is necessary within the range of discussed problem.

Adaptive theory – it assumes that decisions are not resulting from a rational process but they come from a gradual and progressive process of adaptation of participants of the market to changing internal and external conditions, as well as limited knowledge of decision-makers. So, the content of decisions is constantly modified by a series of smaller adaptive actions; usually it doesn't result from realization of one, coherent and general plan of action. It takes under consideration mostly the pragmatic orientation – it serves for solving current problems thanks to decisive flexibility, ability to adapt and search for new compromises.

The beaurocratic theory of Max Weber – it is base on an assumption that the structure of the decisive process itself significantly affects the content of the decision. Dividing functions and hierarchic structure of posts, i.e. hierarchical making decisions within frames of strictly determined legal regulations leads to providing high efficiency of functioning of the organization. Hence, this model in practice is based on strict division of work combined with strong authorities of supervising management and it is subjected to different deviations, often connected with dysfunction (bureaucracy).

> ***The decision model*** *is the basic notion of theory of decision*[23]**.** *It means that theoretically it represents a part of reality that synthetically describes a decisive problem.*

Such model should make possible the qualification of a set of admissible decisions and the set of optimum decisions, if only such sets exist[24].

In most cases models are built for needs of identification of a decisive problem (most often in a form of mathematic model); however problems that occur concern different disciplines, so it is possible to find also statistical, economical, computing (IT), as well as philosophical and psychological problems.

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[22] Straffin P.D., *Teoria gier [Game theory]*, Wydawnictwo Naukowe Scholar, 2004.

[23] Drabik E., *Zastosowanie teorii gier w ekonomii i zarządzaniu [Application of the game theory In economy and management]*, Wydawnictwo Szkoły Głównej Handlowej, Warszawa 2005.

[24] Straffin P.D., *Teoria gier [Game theory]*, Wydawnictwo Naukowe Scholar, 2004.

Literature of the subject[25] indicates the variability of appearance and application of decisive models. A short overview is presented below.

Model of limited rationality – search of first satisfying decision, when there is a criterion determining the minimum of satisfying conditions, and when variant from the set of recognized variants fulfills accepted criterion or is better than this criterion; it doesn't require rationality.

Model of limited rationality:

1) subjectively (deciding person) – lack of qualifications, negative characteristics,
2) objectively (regularity of functioning of the organization), including:
   - structural (accepted division of work),
   - cognitive – wrong circulation of information, superfluous, lack,
   - motivation – decision are undertaken reluctantly if mistakes are punished,
   - competitive – wrong spread of competences, time.

Decisions are undertaken in similar phases; yet they don't have to be the best or rational, etc.

"Waste basket" model, making decisions does not happen sequentially, for example the solution of the problems appear before the analysis of the problem.

The technology of foolishness model. Aims should not be treated with exaggerated attention, intuition is very important, hypocrisy and hypocrites shouldn't be ruthlessly condemned– maybe they will be able to do something good; the memory is an enemy of the decision-maker, experience can also be the enemy of the decision-maker.

Rational model – decisions result from a logical, ordered action that includes mental operations: from recognizing the problem to its complex solution and to prediction of results of implemented decisions;

Procedural (beaurocratic) model – in accordance with rules, procedures, regulations concerning the functioning of the organization;

Traditional model – the decision is made on basis of gathered experience and tradition in methods of action; so, a new problem is solved with use of old and recognized methods, i.e. in accordance to conclusions resulting from hitherto existing practice;

Visionary model – decisions can result from an impulse or something similar, like it can be an experiment or innovation;

Fundamentalist model– decisions result from existing theories, concepts or enforced system of values and they constitute consequences of acceptance of "the only right formula" – finished prescription on accurate decisions;

Political model **–** the decision is resulting from a trial of strengths, superiority of one group over another or from a coalition; while making such kind of decisions only support is important, information is not;

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[25] Witkowski T., *Decyzje w zarządzaniu przedsiębiorstwem [Decisions in corporate management]*, Wydawnictwa Naukowo-Techniczne, Warszawa 2000; Straffin P.D., *Teoria gier*, Wydawnictwo Naukowe Scholar, 2004.

Pragmatic (compromise) model – with regard to rather large cognitive limitations and uncertainty decisions state a compromising solution. They consider contradictory opinions. Such type of decisions usually includes priorities that can be accepted without disturbing interests of all engaged parties.

Table 1.6. Classification of basic decisive techniques

Sort of decision	Decisive techniques	
	traditional	modern
Programming (routine, repeatable)	– habit, – administrative routine: standard procedures	– operational research, – data processing.
Non-programmable (happens once, new, poorly definite)	– judgment, intuition, creation, – work rules, – selection and workers' training.	Technique of heuristic solving the problems – training of decision-makers, – constructing heuristic programs.

Prepared on basis of: Witkowski 2000

1.3.4. Using research methods in the decision-making

Utilization of straightforward methods in decisive processes can give surprisingly good results. However explorers do not surrender and in search of the true vision of decision processes they use with a whole batch of methods and techniques, such as[26]:
- projection – giving the view inside things that are hidden or unperceived,
- stimulating – retracing relations between elements of the process or revealing their true meaning,
- observations – concerning gathering materials for analysis of the process with minimum participation of examined or without their knowledge.

Projection method and techniques have their beginnings in psychology and psychiatry.

> ***The projection*** *in primitive psychoanalytic meaning is a situation, in which the studied person throws out and assigns to his environment his unacceptable characteristics, feelings and desires.*

[26] Janowicz R., metody decyzyjne, http://www.pentor.pl/17582.xml/ 01.12.2009.

However, in marketing inquiries projection techniques provide diagnosing acceptable and inacceptable, realized and unrealized areas of object of research. Techniques can be applied both in individual investigations, as well as in collective study. Tests of associations and unfinished sentences can be an example. They are used for collecting first, automatic and uncensored by the process of rational analysis of associations and reactions on particular marketing problem (category) and for determining the relation of consumers to this problem (which can be for example the process of making a decision, category it does concern, brands, etc.). The technique of animalization is developing simple tests of associations[27], it usually serves for identifying characteristics of associated to examined objects by projecting them into animals (for example the lion means power, the cheetah – speed, the dog is faithfulness, the owl is wisdom, etc). The scientist analyzing results of the study made with help of the method of animization uses knowledge of the subject of stereotypes of perceiving individual animals in determined cultural area. Expressive techniques are another group of projection techniques. Examined people express themselves with use of images, words, or other forms of expression. For the majority of people drawing and other forms of plastic expression are rather rarely applied means of expression; therefore they are treated as instruments being under smaller verification and control of the environment; this enables revealing more content, of which we are not aware. During the drawing they are stimulating remembrances and imaginations connected with unaware contents and including less censored material. Such sensation of anonymity (protection from the confrontation) causes less anxiety and reduces the probability of development of defensive attitude. It results in appearance of unexpected issues that initiate new discussion and cognitive and decisive processes. Moreover – creating a particular work, i.e. drawing, constitutes an easier way to communicate with others than verbal expressions of personal sensations, especially if they cause fear. Still, during the analysis of plastic works we must remember that even a very detailed opinion of value of drawings with use of psychosometric procedures doesn't necessarily allow explaining their symbolic value without comments from the side of examined persons. Responds from many studied can individually refer to different dimensions of determined phenomenon and problem, but all of them collected together enable describing a common reality, range of needs and expectations that are supposed to be fulfilled thanks to undertaking an optimum decision. Most common used techniques of visual and verbal expression are: bubble test, fleecy clouds test, thematic drawing, collage. In specialist groups it can be for example a probation designing. Most advanced methods of projection use structurized sets of plastic works (photographs, pictures, symbols), films, musical compositions, that are supposed to diagnose the symbolic meaning and preparing a methods of interpretation. The method of subliminal associations of Brand Sight PENTOR Research International is an

[27] Janowicz R., metody decyzyjne, http://www.pentor.pl/17582.xml/ 01.12.2009.

example of a mean for such research. It uses the method of associations. It is an effective instrument of diagnosis that serves for examining fundamental dimensions of category, brand and it helps identifying basic values of the category. This method allows diagnosing the "real" level of identification initiated by the examined category of product or brand, especially in reference to negative dimensions that might be hidden, unaware or reluctantly disclosed by examined persons. Brand Sight consists in assigning pictures from a special set to examined objects. Each photograph has a special meaning related with associations and with marketing. Images selected by responding persons should be connected into groups (according to a special model), it enables analyzing them together and determining dimensions that are characteristic for particular categories of products and what distinguishes them from others[28]. Decision-makers gain a wide spectrum of analysis of the studied problem thanks to elaborations obtained on basis of projection methods[29].

The stimulating method is another method used in processes of making decisions. Sometime it happens that along the process of recognizing motives of decisions participants find difficult to be aware of the occurrence of some components of the decisive process and precise particular elements of the decision (reconstruct the real structure of whole process of the examined phenomenon). In their description of the process respondents focus only on individual elements and they forget about the phenomenon as entity. Then the scientist uses techniques that allow arranging participants of the investigation. Simple methods of putting in order, grouping, segregating and creating opposite groups of values/features are often sufficient, it is enough to build chains of associations, use techniques of active writing, etc. There is also been using advanced techniques that enable fully structurizing phenomena, like for example techniques of creative thinking. Examination of needs and research of directions of modification of the offer can be made with help of techniques of deductive thinking (e.g. "What would be, if…?"), natural human liability to improving, ability to generate associations.

Next method is *observation***.** These methods are used the more and more often

It can be performed in experimental conditions, for example in trial shops, electronic simulators of shopping; but also in natural conditions. Application of the method of observation can find things that are hidden, which role for the decisive process respondents are not aware.

> ***Observation*** *always concerns particular behaviors, actions and symbolic interactions of the decisive process.*

Moreover, observation allows knowing the language that respondents use, as well as their informal communication symbolic code. Still, it is important to remember while using methods of observation that the object is always the behavior

[28] Ibid.
[29] Ibid.

or a set of behaviors, which have their subjective sense, as well as objective social importance. Facing conclusions presented above, the analysis of results of observations requires an accurate interpretation of subjective behaviors on individuals and the social meaning of particular action or behavior[30].

Scientists generally combine quantitative and qualitative methods for good cognition and description of the process of making decisions, this allows them to identify and describe components of the process, but also to measure the weight of each component.

Thematic questions for the chapter 1

1. Discuss the notion of problem
2. Characterise the problematic situation
3. Classify problems in the process of enterprise management
4. Name strong and weak parts of a process of individual making decisions
5. Name strong and weak parts of making decisions in a team
6. Describe three conditions of efficient understanding of a problem
7. Characterise the course of an analysis of a problematic situation
8. Classify problems related with the market lifecycle of an enterprise
9. Present the scheme of the process of solving a problem
10. Characterise differences between deciding and a decision
11. Classify management decisions
12. Describe on what depends the decisive process
13. Describe the preparation phase in a decisive process
14. Describe the decisive phase in a process of making a decision
15. Characterise the impact of a new knowledge on the system of making decisions
16. Name and characterize decision rules
17. Describe the theory of a rational decision making model
18. Describe the Adaptation theory
19. Describe the Bureaucratic theory
20. Characterise a model of limited rationality
21. Characterise a “waste basket” model
22. Characterise a rational model
23. Characterise a procedural model
24. Characterise a visionary model
25. Characterise a fundamentalistic model
26. Characterise a political model
27. Characterise a pragmatic model
28. Characterise basic decisive techniques

[30] Ibid.

Chapter 2
Problems in the decision making

Introduction

Decisions in the process of management mainly concern the future considered in different perspectives of time. The future is of notes and mathematical copy of present experiences; it is and new combination of chances and threats, therefore if affects the potential success or defeat of the decision. Although it is being realized mostly in different situations of everyday life and economic activity, making decisions is related with various barriers. Difficulties are most often connected with the environment incertitude, as well as with the risk that the decision-maker is apt to accept, with the personality of the person that makes the decision, individual sense of fear, control and temper. Another type of difficulties in the process of making decisions is related with conflicting environment that requires a specific approach to solve them, i.e. with making decisions with taking under consideration sociological and psychological variables that directly affect the problem.

2.1. Objective barriers in the decision making

- Barrier of „obedient thinking" (hierarchic) – it consists in accepting and fallacious belief, that decision-maker (manager) must know more than his workers, even though it is happening, that hey doesn't have expected competence at disposal;
- barrier of the own uncertainty (collective wisdom) – it accepts a false opinion that the collective decision is always wise, because of the wisdom of the group („two heads are better than one"), in the evaluation of the majority it is always more sensible than the decision of one person;
- tactical barrier (personal interest) – it relies on the fact that the decision-maker is hiding own real objectives and he is playing a „game of appearances", manipulating opponents for creating appropriate conditions for personal achievements of his goals;
- the barrier of security and escape from responsibility – it consists the idea of choosing from the range of available solutions that stay in competence of the decision-maker such a decision that will satisfy the superior.

Barriers that hamper or make the process of rational decision impossible are barriers as follows[1]*: organizational, legal, structural, economical, cultural, technical, information, asset, motivation.*

Errors made in the process of making decisions result from various causes: those of which decision-makers are aware but also of unrealized ones.

They are mostly caused by lack of knowledge about objectives, badly determined goals, not noticing influences of the environment, incompetent or inadequate information or wrong advisers and experts. The illustration 2.1 presents causes of ineffective decisions.

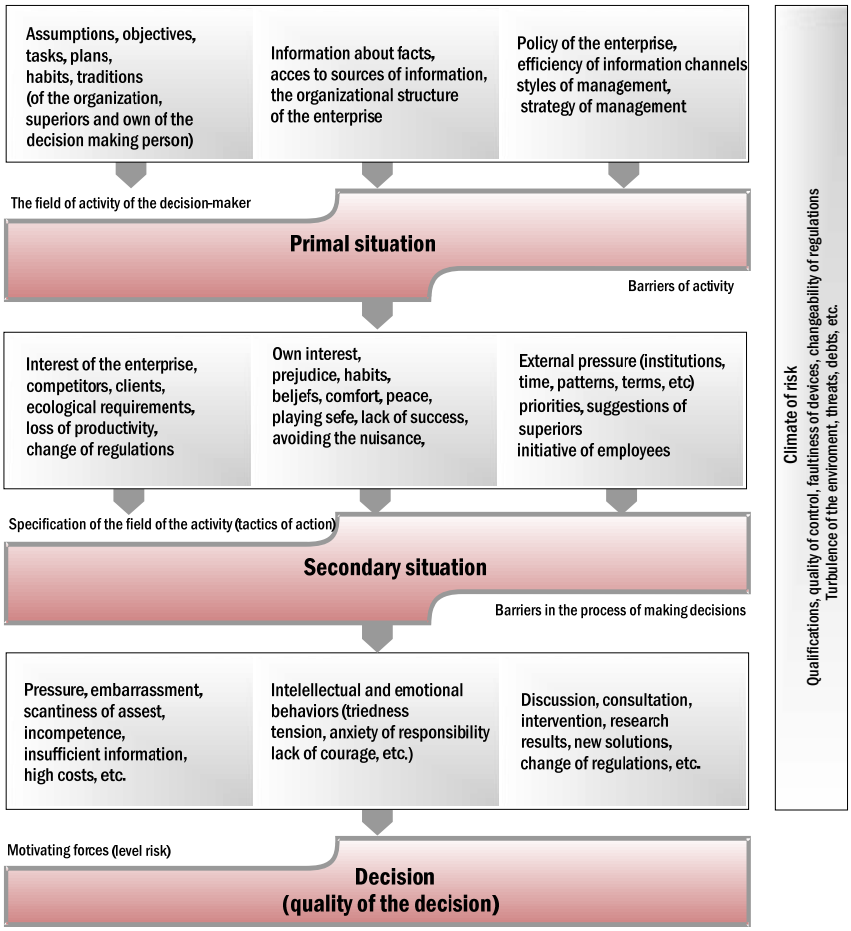
Assumptions, objectives, tasks, plans, habits, traditions (of the organization, superiors and own of the decision making person)
Information about facts, acces to sources of information, the organizational structure of the enterprise
Policy of the enterprise, efficiency of information channels styles of management, strategy of management
The field of activity of the decision-maker
Primal situation
Barriers of activity
Interest of the enterprise, competitors, clients, ecological requirements, loss of productivity, change of regulations
Own interest, prejudice, habits, beljefs, comfort, peace, playing sefe, lack of success, avoiding the nuisance,
External pressure (institutions, time, patterns, terms, etc) priorities, suggestions of superiors initiative of employees
Specification of the field of the activity (tactics of action)
Secondary situation
Barriers in the process of making decisions
Pressure, embarrassment, scantiness of assest, incompetence, insufficient information, high costs, etc.
Intelellectual and emotional behaviors (triedness tension, anxiety of responsibility lack of courage, etc.)
Discussion, consultation, intervention, research results, new solutions, change of regulations, etc.
Motivating forces (level risk)
Decision (quality of the decision)
Climate of risk
Qualifications, quality of control, faultiness of devices, changeability of regulations
Turbulence of the enviroment, threats, debts, etc.

Figure 2.1. Causes of ineffective decisions. Personal elaboration

[1] Ibid.

2.2. Subjective barriers in the decision-making process

The acquaintance of reasons for mistakes in the process of making decisions can facilitate for decision-makers overcoming them and it might contribute to raising qualities of requested solutions. Many barriers that have a destructive impact result from psychological and social conditions. Most common barriers are presented below.

Barrier – *positive image of oneself* – describes a situation, when many decision-makers don't have competences for accept a determined opinion. They are aware of their imperfection, they have a low self-esteem, which however doesn't disturb them strengthen their power, mainly based on control.

Next are *managerial ambitions* – many managers (especially young ones) often try at any cost to demonstrate successes, but sometimes they lack of competences for determining objectives. This can lower effects of their work.

Next barrier concerns *emotions and stress* – the work of a manager is related with sensation of strong emotions; both positive, but also negative. The process of making decisions can be disturbed under influence of emotions, the decision-maker can start to act impulsively, reckless, and sometimes even with aggression. The too long time of the influence of negative strong emotions on the manager causes the appearance of distress, which leads often to dissociation, decrease of intellectual functions and skills of correct evaluation of the reality and in result – to lower efficiency in making rational decisions[2]. A group of syndromes opposite to those presented above is the resulting from *eustress*. Establishing new ambitious aims, overcoming the problem and the aspiration to the success are a consequence of its occurrence.

Next is *relaxed avoiding* – it concerns a situation, when the decision-maker finds out that consequences of lack of decision in his actions will not be grave; therefore he restrains himself from implementation the prepared solution.

Next barrier is *relaxed change* – it takes place when the decision-maker makes the decision about taking action, because he notices that longer dragging away will encounter a ruthless penalty. Under the influence of the pressure of time he most often takes hasty and unconsidered decisions.

Following barrier is *defensive avoiding* – the decision-maker is facing a problem, with which he isn't able to handle, so he is delaying the action of making a decision or is shifting the responsibility onto somebody else. He usually lets other person make a decision (and suffer unpleasant consequences in case of a defeat).

Panic is another barrier, the decision-maker finds himself in a situation of making a risky decision under the pressure of time and he occults the frustration and stress. Such situation often results with panic and unformed evaluation of the situation.

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[2] Obuchowski K., *Psychologia ludzkich dążeń [Psychology of human aspirations],* Państwowe Wydawnictwo Naukowe, Warszawa 1972.

The rule of domination is related with fixation on one solution. If the decision-maker in early phases of the decisive process prefers a particular solution, which he finds most preferable; he changes his optic of seeing other solutions and he manipulates the process, so that the option he prefers would be selected.

Limited rationality is a barrier, according to which assumptions people aim to solving problems that would fulfill their aspirations instead of the optimum ones. Instead of to seek the perfect decision they are comfortable with a decision that fulfills their needs only in a sufficient degree.

Internal pressure is the last barrier presented here – the manager's behavior is related with internal pressure resulting from a whole range of internal and external circumstances. The internal pressure must be optimum and balanced, so that it could motivate and upgrade the efficiency of action.

2.3. Insecurity and risk in decision-making processes

2.3.1. Insecurity

An objective evaluation of a situation, of factors affecting the process in a positive or negative way but being connected with conditions for the functioning of the organization in the future is extremely important in the process of making decision. A manager can evaluate future events in a scale from situations predictable in 100% to absolutely unpredictable ones. The point situated on the scale between those two extremes can be determined as: certitude, risk and incertitude[3]. However, in conditions of absolute sureness we actually observe only one result for every alternative and reliable information about this result. Then the decision-maker has the full knowledge about what can happen in the future. Therefore he is limiting himself and formulates only few alternatives and he selects the solution that maximizes the usability that is valuated by him the most. Making decisions in conditions of certitude is relatively simple because it relies on making a choice between situations, in which results of alternative options are well known for the person that makes the decision[4]. The incertitude of decision, which is the opposite of the sureness in a problematic situation, is not equal with risk. In conditions of incertitude the decision-maker doesn't know the probability of occurrence of every potential result, he might even don't know between what possibilities to choose.

> ***Making rational decisions*** *(conforming with the course of decision process) in conditions of incertitude is possible only because there is a lack of alternative solutions; this reduces significantly the possibility of selection.*

[3] Koontz H., Weihrich H., *Essentials of Management*, New York 1990, p. 115-117.

[4] Penc J., *Decyzje w zarządzaniu [Decisions in management]*, Wydawnictwo Profesjonalnej Szkoły Biznesu, Kraków 1997, p. 162.

Acting in conditions of incertitude is often perceived as benefiting coincidences and „luck". The „lucky" decision maker is often able to get out from insecure situation without any effort or losses; still, management and such conditions in long term perspective requires a reliable analysis of threats resulting from the changing environment, which would be based on the theory of probability[5]. Each uncertain situation is individually perceived and evaluated by decision-making persons. The subjective sensation of incertitude is defined in the literature as a phenomenon called *„tolerance of incertitude"*[6]. This phenomenon depends on factors, like: first – individual features of the decision maker, such as temperament, assertiveness, self-esteem, intelligence, etc. and also from such characteristics of the organization, as openness to changes and the climate in the organization. Social and cultural factors have a very important role in the process of shaping the tolerance of incertitude. Those factors encounter following conditionings: geopolitical and historical, the vision of social development, the believe in possibilities of the organization, etc.

*A high level of **tolerance of incertitude** increases the range of making decisions, it reduces the number of fears and resistances, it develops solving problems creatively, raises the degree of competences of employees*[7].

*A low level of **tolerance of incertitude** weaken the activity, hampers the development of upward initiatives, leads to formalization of work methods and behaviors in the organization, it makes difficult implementing changes and reduces the need of success*[8].

The level of tolerance of incertitude in the company affects the strength of its aspiration to search and implement changes, look for chances of development for the management, but also for workers. Sometimes in periods of long lasting balance on the market, when the enterprise functions in conditions of absolute certitude, its employees operate with routine, they don't evolve. It is necessary to search for ways of upgrading the level of tolerance of incertitude in those situations.

[5] Tyszka T., *Analiza decyzyjna i psychologia decyzji [Decision-making analysis and psychology of the decision]*, Państwowe Wydawnictwo Naukowe, 1979, p. 45-65.

[6] Ibid.

[7] Penc J., *Decyzje w zarządzaniu [Decisions in management]*, Wydawnictwo Profesjonalnej Szkoły Biznesu, Kraków 1997, p. 163.

[8] Ibid.

2.3.2. Risk

It is possible to determine a situation of risk when at least one of elements in the process of making decision is not known, but the probability of its occurrence and the probability of appearance of each potentially possible solution is known. Each manager must consider different sorts of risk while making decisions: legal, financial, marketing, personal, etc. The risk is written in activity of enterprises, and in the same – in actions of managers.

> ***Risk*** *can be determined as a variance, expected loss, size of the loss or a difference between a victory and loss.*

The risk can be calculated with use of objective methods, like for example: theory of probability, statistical methods. It is possible to determine the scale of size of risk[9]. Risk can be graduated on basis of objective analyses; it has a significant influence on the process of making decisions about the choice of an alternative.

Risk also means a possibility of deflection from defined objective. The probability determining the level of risk is measurable (calculated) or sensed by the decision-maker, who operates on basis of his knowledge and experience gained in analogical situations with similar course that have happened in the past[10].

A modern manager should not avoid risk but on the opposite – he should take it for gaining more benefits. However, he should use evaluations of the quantification of the probability and studies of alternative scenarios, not only his intuition. A manager operates in the area of acceptable risk, so he should recognize limits of hazard and ably administer the risk by adjusting changes in the company to changes on the market.

2.4. Person of the manager but the decision making

2.4.1. Functions of managers in the organization

Supervisors (managers) hold the management in organizations. The senior staff is distinguished on the basis of the kind of taken decisions and of performed tasks, places in the organizational structure and managerial abilities.

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[9] Kujawińska A., Więcek-Janka E., *Statystyka matematyczna [Mathematical statistics]*, Wydawnictwo Politechniki Poznańskiej, Poznań 2010.

[10] Penc J., *Decyzje w zarządzaniu [Decisions in management]*, Wydawnictwo Profesjonalnej Szkoły Biznesu, Kraków 1997, p. 164.

A group of people or an employee; are an object of ***management****. Relations between the supervisor and the group have a formal or unofficial character. First type of relation authorizes the manager to make decisions from the range of planning and organizing of work of his subordinates, giving instructions and controlling effects and applying sanctions.*

Manager's effectiveness depends from his formal authorizations and technical competences. And when an efficient manager is also able to efficiently influence interpersonal relationships; he is being called a good *leader*. A *leader* is able to shape behaviors of other people efficiently by making decisions; he operates on basis of social influence instead of formal power. He is also able to create a vision of development and giving incentive for people's motivation[11]. Leadership is related with individual characteristics and personal skills. The leader's authority is voluntarily accepted by members of the group. The manager has the highest position in the hierarchy of the group, in other words he has the biggest power. His power can arise from his formal position, professional competences, personality and charisma, as well as emotional dependency from the staff. The ideal manager is a person that combines the formal authority with skills of proceeding with people.

In direct contacts with employees the leader is able to achieve deliberate objectives thanks to competent shaping his behavior.

There are two approaches evaluating sources of the effectiveness of influencing other people. One of them is called universalistic. It assumes that people become leaders because they have a particular range of knowledge and skill that are preferred and they have preferred personal features. Even catalogues of such abilities were constructed. For example: Szczupaczyński[12] enumerates the ability of logical thinking and activating other people, obstinacy and self-control as characteristics and competences that are important for a leader. Whetten and Cameron[13] distinguish such personal and interpersonal skills, as: improving the self-awareness, managing the stress, creative problem solving (personal), active communicating, enlarging the own authority, motivating other, managing conflict (interpersonal). The effectiveness of management depends also on the proper selection of the style of influencing the group. Various situations require different skills from the man-

[11] Więcek-Janka E., *Zmiany i konflikty w organizacji [Changes and conflicts in the organization]*, Wydawnictwo Politechniki Poznańskiej, Poznań 2006, p. 87.

[12] Szczupaczyński J., *Anatomia zarządzania organizacja [Anatomy of the management organization]*, Wydawnictwo Międzynarodowej Szkoły Menedżerskiej, Warszawa 1998.

[13] In: Koźmiński A.K., ed., Zarządzanie. Teoria i praktyka [Management. Theory and practice], PWN, Warszawa 1996.

ager. Paying attention to situational aspects is rather used for developing practical abilities and is more effective, since it puts emphasis on specific patterns of leadership behaviors. Basic techniques of management were presented in the figure 2.2.

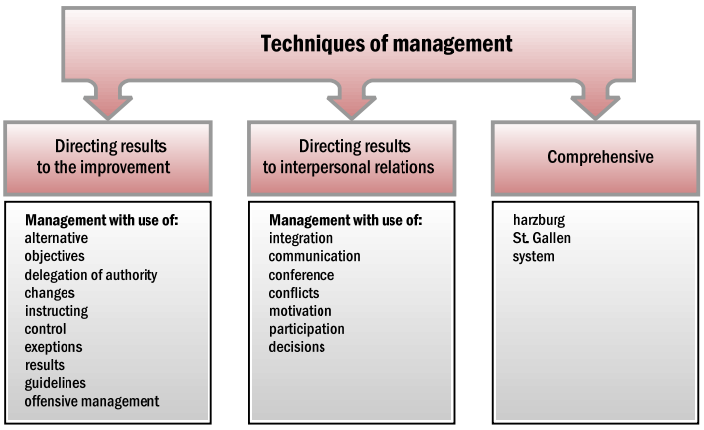

Figure 2.2. Classification of techniques of management.
Prepared on basis of: Stoner et al. 2001

2.4.2. The term and functions of the leadership

Stoner (et al.)[14] defines *leadership* as „a process of directing and influencing an activity of members of a group, associated with its objectives". Leadership is a term determining something different than management. The manager is an efficient planner, an organizer and a controller. The leader has additional abilities to have influence on employees. He is able to motivate them, to arouse enthusiasm and devotion. Workers are contributing in determining the position of the leader and they enable the process of leadership through their compliance and indication of the leader. The leader can also use different sources of power; for example awarding, extorting, punishing. The leadership is related with values. It is the authority that teaches workers to behave ethically and it reinforces ideas. Sources of the leadership can have a formal nature (having a post of a manager in the organization). However, there exists a leadership that hasn't been legislated by the organization and its ability of having affect arises outside the formal structure[15].

A group needs someone, who would solve problems and settle conflicts for the best efficiency of its functioning. Those are two main functions of a leader: the one related with tasks and the one related with maintaining the solidity of the group.

[14] Stoner J., Freeman E., Gilbert D., *Kierowanie [Management]*, PWE, Warszawa 2001, p. 453.

[15] Robbins S., *Zachowania w organizacji [Behaviors in the organization]*, PWE, Warszawa 1998, p. 297.

The ability of fulfilling both determined functions is connected with efficient management. In practice, a manager often can play one of those roles. Then, usually a division of functions between two leaders comes to occurrence.

2.4.3. Styles of leadership

Two functions of leadership indicated above are finding expression in different styles of management. „Styles of management are various patterns of behavior applied by leaders in the process of management of their employees and having effect on them"[16]. Managers oriented on tasks are exercising rigorist supervision above employees in order to guard the due execution of tasks. They are paying greater attention on the realization of work than on the development or satisfaction of employees. Managers oriented on employees pay more attention on their motivating than on their controlling. They aim to friendly relations based on mutual trust and respect with employees; they often allow them to participate in the process of making decisions that concern themselves. The figure 2.3 illustrates the scale of leadership behaviors.

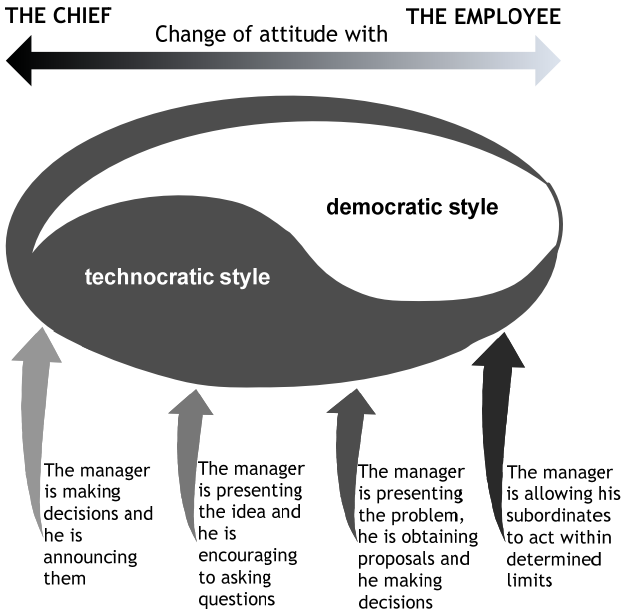
THE CHIEF
Change of attitude with
THE EMPLOYEE
democratic style
technocratic style
The manager is making decisions and he is announcing them
The manager is presenting the idea and he is encouraging to asking questions
The manager is presenting the problem, he is obtaining proposals and he making decisions
The manager is allowing his subordinates to act within determined limits

Figure 2.3. Scale of leadership behaviors according to Tannenbaum and Schmidt. Personal elaboration

[16] Stoner J., Freeman E., Gilbert D., *Kierowanie [Management]*, PWE, Warszawa 2001, p. 457.

Tannenbaum and Schmidt have presented an idea so that managers would notice three sets of „*powers*" before they choose their own style of leadership[17]:

- powers of the manager, his knowledge, values and experience, as well as environment from which he comes from;
- powers of subordinates, i.e. features like: need of membership and freedom of action, Reed of accepting responsibility for decision that are being made, identifying oneself with objectives of the organization, sufficient knowledge and experience;
- powers resulting from particular situation, such as the style preferred by the organization, size and density of individual group, its essence, pressure of time.

An *evolutionary model*, prepared by Hersey and Blanchard[18] is one of main situational views on the leadership. According to them establishing the effective style an acquaintance of aims of the organization and knowledge about employees are valid factors for leadership. Depending on the phase of the development of subordinates or the group managers should change the style of his leadership. In the phase of forming groups whether towards recruits behaviours orientated mainly to tasks are most proper. The group and employees must be acquaint with objectives of the organization: the collective and individual ones; they should acquaint with rules of proceedings and the culture of the organization. In the preliminary stage of the work it is important to give a point of reference to the employee and the group, to situate them in a certain structure, to reduce vagueness and possible anxiety. Along the development of the group and the learning of subordinates it is crucial to gradually pass to behaviours orientated to people. It is still important to concentrate on the task and giving a clear guidance, since worker still aren't able to act independently, gradually trust of the leader for behaviors of the employee or groups is growing. If the group is experiencing the dramatic crisis, a concentration on mutual relationships is important, it means solving current problems; but next one should concentrate the energy of the group on the task. When the group is mature, and employees have greater abilities and motivation for achievements, the leader must not give directives. He should encourage for taking greater responsibility, give more freedom of action and of making decisions, support and show the kindliness. In the phase of effective independent action the manager already doesn't have to give special encouragement for working, but should leave to free hand to his employees. The evolutionary style of management not only is motivating employees, but also is facilitating their professional development. Fiedler is the author of one of situational models[19]. He made an assumption that it was hard for managers to change the style, which already provided them success. The majority of managers don't have the elasticity and attempts to adapt their style to changeable situa-

[17] Stoner J., Freeman E., Gilbert D., *Kierowanie [Management]*, PWE, Warszawa 2001, p. 458.

[18] Ibid., p.459.

[19] Ibid., p. 460.

tions are fruitless. It is possible to achieve the efficiency of the group by adaptating the manager to the situation or by changing the situation so that it would be right for given managing.

Fiedler measured the style of leadership with the NLW indicator illustrating to what extent the manager positively or negatively evaluates his least liked employee. Manager, who is using relatively positive expressions, is more tolerant and orientated to interpersonal relations (high NLW indicator). The author distinguished three leadership situations: relationships between the leader and members of the group, the structure of the task and the imperior position of the leader. These situational variables are facilitating determining, what style will be effective. Next the author determined eight possible combinations of these three situational variables (good – bad relationships, structurized – unstructurized tasks, strong –weak position) and eight leadership combinations and analysed effectiveness of action of managers with a high and low NLW indicator.

A proper adaptation of the style of leaderships to the situation guarantees getting expected effectiveness. Sometimes managers, knowing their dominating style of action, can change parameters of tasks, the position or relationships up to it in order to manage more effectively the group of workers. The dependence of the style of conducting on the situation was described in the picture 2.4.

Other line of enquiry concerning the leadership is concentrated on the group[20]. In the *group approach* a leadership is being considered in categories of the function satisfying needs of the group. They concern the task, maintaining the group and individuals.

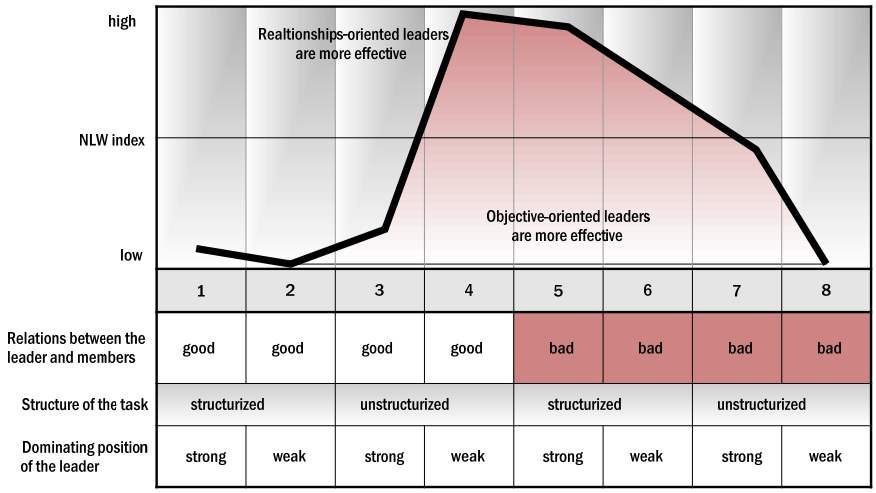

Figure 2.4. Changeability of effective styles of leadership depending on the situation according to Fiedler, Chemers. Prepared on basis of: Stoner et al., 2001, p. 467

[20] Steward D., Praktyka kierowania [Practice of management], PWE, Warszawa 1997.

As the figure 2.5 illustrates, these needs are mutually having an influence on themselves and certain tensions always appear between them. The leader is bearing responsibility for all three areas of needs. He is leading the group to the realization of the task, providing respect for individual members of the group and the possibility of improving them.

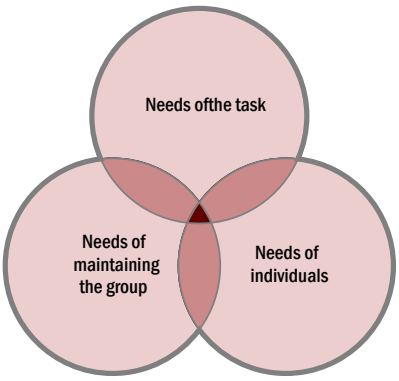

Figure 2.5. Three-circles model. Prepared on basis of: D. Steward, 1997, p. 168

Different factors affect the effectiveness of specific styles of conducting[21]:

- type of relations of the organization with the environment: whether are these are market reactions, in which the effectiveness style of conducting is important, whether bureaucratic, which the productivity isn't important in;
- type of tasks of the group: a democratic style is supporting untypical tasks;
- psychosocial characteristics of employees (motivation, expectations, needs, habits); finally reactions of employees decide about the efficiency of particular style;
- the personality, competence, experience and expectations of the manager;
- the organizational culture and principles of operation accepted in the enterprise; the style of management is included in a set of adopted principles and norms;
- expectations and behaviours of superiors of the leader, determinative norms of his behaviour as example to be imitated;
- organizational assets, e.g. finances for remunerations or material equipment of the group, in situation of a deficit of assets the role of general management of those assets become more important.

Taking into account all environmental and individual factors in analysis of managerial action of the leader of the group, it is possible to distinguish features of perfect leaders of group and organization.

[21] Szczupaczyński J., *Anatomia zarządzania organizacja [Anatomy of the management organization]*, Wydawnictwo Międzynarodowej Szkoły Menedżerskiej, Warszawa 1998.

2.4.4. Qualities of a leader

The person recognized as a leader constitutes a certain value for the organization. He has an invaluable influence on employees. Therefore sociologists and psychologists are seeking for a model of a leader; particularly they are trying to establish the set of common characteristics for outstanding and effective leaders, which could constitute the criterion of selection of people for managerial posts.

Steward[22] distinguished features and abilities recognised as the most valuable for the top-level managements, arranging them according to their importance. Basing on studies of efficiently acting general managers of enterprises in good condition he has prepared a following list of characteristics: decision-making skills; leadership; righteousness; enthusiasm; imagination; willingness to the hard work; analytical abilities; understanding for other; ability of noticing chances; ability of dealing with unpleasant situations; ability of fast adjustment for changes; tendency to taking a risk; entrepreneurship; the ability of saying thinks clealy; mental acuity; ability of efficient administering; nimble mind; perseverance; ability for working many hours.

> *Five highest assessed abilities of managers: decision-making skills; leadership; righteousness; enthusiasm; imagination.*

Besides features and abilities described above, by which managers should be characterized, he is also enumerating: professionalism, intelligence, self-control, organizational abilities, punctuality, loyalty, keeping principles of ethics, patience and communicativeness. A person with a perfect set of characteristics of a leader can still efficiently function and realize expectations on one post but he can have problems with dealing with another. The behavior of leaders is a purposeful acting in particular situation that is based on experience resulting from similar decisive situations. It is a resultant of the influence of the environment and personal assets of the individual. Orders of superiors, requirements of contracting parties or the distress can be recognized as external factors determining their actions that managers are aware of. The state of health, psychological structure and the spirit are internal factors. Both groups of factors condition the orientation on people or on tasks.

Mc Gregor[23] included behaviours of superiors towards subordinates in two theories: X and Y. An opposing look of managers at motives of action of its subordinates is main assumption of this theory, and according to only positive or exclusively negative attitude, managers are making decisions in the organization. The table 2.1 presents assumptions of the theory X and the theory Y.

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[22] Steward D., *Praktyka kierowania [Practice of management]*, PWE, Warszawa 1997.

[23] Stoner J., Freeman E., Gilbert D., *Kierowanie [Management]*, PWE, Warszawa 2001, p. 460.

Table 2.1. Opinion of managers at motifs of subordinates

Theory X	Theory Y
Man's nature is that he doesn't like to work and that he avoids it; Man must be forced to work; Man must be controlled; Man must be threatened with sanctions; Man avoids responsibility; Man is not ambitious; Man works led by his need of security.	Work is a natural activity, similarly to play or rest; People prefer self-directing; People submit themselves to self-control; Man has inexhaustible intellectual abilities.

Prepared on basis of: Stoner et al., 2001

According to another classification four groups of managers have been identified, taking into consideration following two continuums: orientation on people and orientation on the objective of the organization and evaluations of variables presented above on a high and low level[24]:

- Isolated manager is featured by small interested in the objective of the enterprise and an small interest in people. He doesn't aspire to any changes, he is careful, attentive, conservative, he prefers administrative work; he refers to established rules, he is precise accurate, correct, solid, patient, calm and discrete.
- Friendly manager – he is characterized with a small interest in the objective and the strong interest with people. He is an understanding person, friendly, he puts emphasis on the development of the personality, he is able to talk long, he is sympathetic, and he is giving the sense of security.
- Eager manager, he is strongly oriented on the objective and has a small interest in people. He is self-confident, aggressive, imperious, bustling; he is demonstrating the initiative, he relies on himself, he applies the supervision, penalties and awards; the objective is most important for him.
- Comprehensive manager, is characterized by a strong orientation both on the objective, and on people; he is featured by strong orientation on the objective, as well as on people, he is interested in techniques of motivation, he prefers team work, he integrates employees, aims in cooperation and wants to achieve goals together with the group.

Cangemi[25] presents types of five relations that can be observed in case of each leader that has gained trust and who has acknowledgement of his subordinates. These are[26]:

[24] Więcek-Janka E., *Zmiany i konflikty w organizacji[Changes and conflicts in the organization]*, Wydawnictwo Politechniki Poznańskiej, Poznań 2006.

[25] Stoner J., Freeman E., Gilbert D., *Kierowanie [Management]*, PWE, Warszawa 2001, p. 460.

[26] Ibid.

- connection with oneself, manifesting itself in understanding own action and constant improving and consisting in raising the crosspiece of achievements of professional goals;
- connection with other, relying on the ability to shape good relations with other members of the organization, both with superiors, and with subordinates; control over own reactions allows to overcome weakness as well as represents a model for other, how to overcome obstacles;
- relation with the organization, consisting in constant observation and inspection of behavior inside the own group and the organization; it allows to avoid directing from behind the desk and enables being in constant contact with subordinates;
- connection with the sphere of its activity, enabling to develop and improve the organization thanks to possessed knowledge and professionalism;
- connection with the community, consisting on the readiness to disseminate in closest environment his experience, the ability and solutions that has been already worked out.

McClleland[27] has popularized the model of three fundamental needs characteristic for leadership individualities, which are presented below in the table 2.2.

Table 2.2. Model of three essential needs of leaders according to McClleland

Needs of leadership characters	
the need of achievements	competing with the standard imposed upon oneself, achieving or exceeding standards of quality imposed upon oneself , seeking unique achievements, need of fast feedback, establishing objectives threatened with the average level of risk, need of achieving long-term economic objectives, formulating plans of overcoming personal, environmental or economical obstacles;
the need of power	firm acting, arousing strong emotions at others, interest in reputation, status and position, exceeding other with effectiveness.
the need of affiliation	need of sympathy, approval and friendship, attachment to social situations, interest in people in work situations, interest in people outside work situations.

Prepared on basis of: Stoner et al., 2001

[27] McClleland D.C., *The achieving society*, Princeton, New York 1961.

Some variables that refer to the individual, to the organization of actions, can replace leadership by doubting in possibilities of outing impact by the formal leader. It results from small flexibility of leaders and from the opinion that the selected style of leadership always will be efficient – independently from current situation. Numerous researches illustrate that in many situations it is not important, what type of behavior represent the leader[28].

2.5. Making decisions but conflicts

2.5.1. Term of conflict

The notion conflict is coming from the Latin word *conflictus,* which means „collision". Conflict constitutes a collision of conflicting interests, objectives, aspirations or opinions of individuals and social groups. Therefore conflicts can have various forms and intensity; from harmless conflicts that can be solved arbitrally to antagonistic conflicts, which solving can have place only by eliminating, damage or subordinating of one of sides[29].

Conflicts are accompanying people in the private life, at work and they concern various aspects of activity. Managers of enterprises are making every effort to eliminate conflicts that result from ignorance, shortcomings, recklessness and incompetence. They lead to bad atmosphere and growing discontent, they lower the motivation to work and contribute for worsening the corporate image. Balawajder[30] determines a conflict as „*a social situation, where occurs contradictions of interests, opinions, attitudes of individuals, as well as social groups that coexist and cooperate in a determined place and time".*

More or less aggressive actions, which are undertaken by individuals or groups towards themselves, who are aware of contradictions of interests or opinions existing between them, are an external manifestation of a conflict. Definitions of conflict are being formulated by representatives of different scientific disciplines, especially sociology, psychology and theory of organization and managements[31]. The sociological approach is as follows:

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[28] Robbins S., Zachowania w organizacji [Behaviors in the organization], PWE, Warszawa 1998, p. 259.

[29] Sikora J., Zarządzanie konfliktem w zakładzie pracy [Managing conflict in the work place], Oficyna Wydawnicza Ośrodka Postępu Organizacyjn., Bydgoszcz 1998, p. 7.

[30] Balawajder K., Konflikty interpersonalne, analiza psychologiczna [Interpersonal conflicts, psychological analysis], Prace Naukowe Uniwersytetu Śląskiego w Katowicach nr 1282, Katowice 1992, p. 4.

[31] Sikora J., Zarządzanie konfliktem w zakładzie pracy [Managing conflict in the work place], Oficyna Wydawnicza Ośrodka Postępu Organizacyjn., Bydgoszcz 1998, p. 8.

Conflict is a lack of agreement in relation to fundamental values and interests of groups.

A conflict isn't pathology but a natural phenomenon. It can have play a positive function by leading to progress and beneficial changes inside and outside the group. A conflict occurring between groups can be stabilizing and giving balance by increasing the cohesion of the group. In the theory of organization and management conflict is a situation in which exist at least two sides. it is appearing when one side perceives a specific change in the system as beneficial, whereas the other – as disadvantageous, whereas simultaneously both sides have an opportunity to make further changes in the system by making decisions in order to achieve goals. Authors of the elaboration accepted the following expression:

Decisive conflict is a situation that can stabilize or destabilize the activity of the organization, in which we observe a contradiction of interests, opinions in processes of solving problems.

2.5.2. Classification of conflicts

Taking psychological criterion under consideration conflicts occurring in the organization can be divided into rational and emotional. *Rational conflicts* result from differences of opinions about methods of solving a particular case and they have not a personal character. Whereas *emotional conflicts* are a result of the determined emotional manner in interaction with another man and they often have irrational character.

The decision making in solving conflicts is associated with the level of revealing them. It is possible to distinguish their following levels[32]:

- *tacit conflict*, which can be treated as primal factor triggering conflicting behaviours, and is manifesting itself with appearing of interpersonal misunderstandings, disturbances in communication, etc.;
- *felt conflict,* manifesting itself with sensations of stress, emotional discomfort, with perceiving the threat etc.;
- *open conflict,* which is characterized by directed aggression, with breaking the communicative continuity, with emotional valuation etc.

The table 2.3. presents the typology of conflicts in the workplace, taking under consideration four criteria: object of conflict, duration of conflict, bacground and forms.

[32] Więcek-Janka E., *Zmiany i konflikty w organizacji [Changes and conflicts in the organization]*, Wydawnictwo Politechniki Poznańskiej, Poznań 2006.

Table 2.3. Types of conflicts in the workplace

Criterion	Types of conflicts
Object of conflict	economical – resulting from principles of division of work, remuneration, property relations social – it concern living matters, working conditions organizational – they concern subordinations, positions, organizational units in the work place the responsibility – they result from the scope of authority, the divergence of entitlements and official duties values and purposes which can be realized by employees – they concern motives, needs and interests of individuals
Duration of conflict	short- and long-term
Bacground of conflict	rational – they result from material, of rational foundations, like power, position, good irrational – they result for fictional, seeming reasons, from suspicions, envies or from social stereotypes
Forms of conflict	open – employees are openly pointing out the cause, purpose of conflict (e.g. claims, complaints, strikes) tacit – they are seen indirectly, and their causes are hidden (e.g. rumours, anonymous letters, personal gameses) organized – conducted according to planned principles (e.g. strikes) unorganized – impetuous, spontaneous

Prepared on basis of: Sikora, 1998

According to *traditional approaches* conflicts are something bad and they are evodence about imperfect functioning of the organization[33]. Protagonists of this attempt proved that conflict was disfunctional result of an insufficient communication, indirectness and lack of mutual confidence between people and inabilities of managers to make decisions. Avoiding conflicts and the decision making of causes aiming to the expression of conflict and correcting behaviours are a consequence of such thinking. Representatives of the *school of interpersonal relations* claimed that conflict is something natural and inevitable occurrence in every group[34]. It doesn't have to be something bad, with application of suitable decisive process it can be even a positive force that raises the efficiency of the organization. In the practical sphere they recommended approval of conflict and they searched for justifications of its appearing. Their views dominated the theory of conflict up to mid-seventies. According to the *interactive approach* adopted at present conflict is not only a positive power, but to some extent it is completely necessary for effective activity

[33] Robbins S., *Zachowania w organizacji [Behaviors in the organization]*, Państwowe Wydawnictwo Ekonomiczne, Warszawa 1998, p. 292.
[34] Ibid., p. 293.

of employees. It justifies the existence of a conflict by caliming that a peaceful and cooperative group is ignoring the necessity of implementing changes and it can be static and apathetic. Taking into consideration conclusions resulting from an interactive way of thinking, managers are being encouraged for supporting a constant low level of conflict for keeping the vitality, capacity for self-criticism and creativity in solving the problem within the group. According to the interactive approach recognizing conflict as exclusively bad or good is wrong.

A conflict doesn't have to be something bad, and what's more; at the proper decision-making process it can become a positive power, increasing the effectiveness of the organization. In the practical sphere they recommended approval of conflict and searched for justifications of its occurence. Their views dominated the theory of conflict up to mid-seventies. According to an *interactive* approach adopted at present, a conflict is not only a positive power, but to some extent it is completely necessary for effective activity of employees. It is being justified in this way, that the harmonious, peaceful and cooperating group is static and apathetic and is ignoring the need to implement changes. Taking into consideration conclusions resulting from an interactive way of thinking, managers are being encouraged to maintain a small level of conflict up, in order to keep the vitality, the capacity for self-criticism and the creativity in the group in solving a problem. A conflict can be building or destructive, depending on his kind, that is from, whether we are dealing with *functional* or *disfunctional* conflict. Constructive participants in conflict are supporting goals of the group and they are increasing its effectiveness. Disfunctional conflicts interfere in effective processes of solving a problem. It is difficult to determine precisely the sort of conflict we deal. The determined kind and level of conflict in one group can support achieving goals, and disturb the same process in another group. However, in different time it may occure dysfunctional or not. The effectiveness of work of the group is the only criterion of distinguishing the kind of conflicts. If the dispute is improving the quality of decision, is stimulating the creativity and changes, an interest and a curiosity of members of the group, is supporting for climate of self-assessment and improvement, it is possible to recognize, that the conflict is constructive. The destructive influence of conflict on the efficiency of the group can cause dissatisfaction, blunting bonds within the group, causes delays in communication, rivalry, reduction of the density of the group, not to mention its disintegration.

2.5.3. Consequences of a conflict

For Walton interpersonal and intergroup conflict with a moderate tension has the following positive consequences[35]:

[35] Scott W.J, Cummings L.L. ed., *Zachowanie człowieka w organizacji [Behavior of man in the organization]*, Państwowe Wydawnictwo Naukowe, Warszawa 1993.

– it increases the motivation and the energy that can be used for implementations of tasks put by the organizational system;
– it is supporting the innovation of individuals and the system as a result of different points of view and from the need of improvements;
– employees better understand their own position, since conflict is forcing them to formulate individual opinions and arguments for standing for their post;
– sides of conflict can achieve a stronger awareness of their identity.

Causes of conflicts are diverse and firmly connected with themselves. They can have an objective or subjective base. Most frequent sources of social conflicts in organizational structures are as follows[36]:

– necessity to share reduced reserves, e.g. financial resources, information, staff;
– diversifying purposes, i.e. individual departments can specialize and diversify depending on the assortment of purposes, tasks and employees;
– visible dominance of the certain group, e.g. department of marketing;
– appearence of competitive objectives, businesses or values (other for, e.g. supervisory board, management board, employees);
– issuing orders to the group at a higher status by the group at a humbler status;
– limiting or reducing the independence of the group;
– imbalance in an interrelationships (e.g. group A depends in the greater degree from the B group than B from A);
– granting certain groups work opportunities according to changeable principles (e.g. flexitime, principles of the inspection of the production);
– planning changes in the organization;
– constructing vague, ambiguous scopes of responsibility, competence, tasks;
– diversifying significance (e.g. of linear and staff units);
– interdependence of work;
– defects and imperfections of the organizational structure;
– defects and imperfections in the industrial engineering, the sale and the work;
– differences in views of crew members on essential matters;
– badly determined system of communication and liaise;
– reduction of the independence of the group;
– faulty process of making decisions;
– mutually contradictory decisions taken in different stages of the management;
– resistance towards changes, which are escalating, when following questions are not being answered: why and, in what extent changes are being implemented?, what can be their results?

[36] Sikora J., *Zarządzanie konfliktem w zakładzie pracy [Managing conflict in the work place]*, Oficyna Wydawnicza Ośrodka Postępu Organizacyjnego, Bydgoszcz 1998, p. 26.

2.5.4. Course of a conflict

It is possible to consider conflict as process compound of four stages: potential the opposition, the cognition and the personalization, behaviours and results[37]. They have been presented on the figure 2.6.

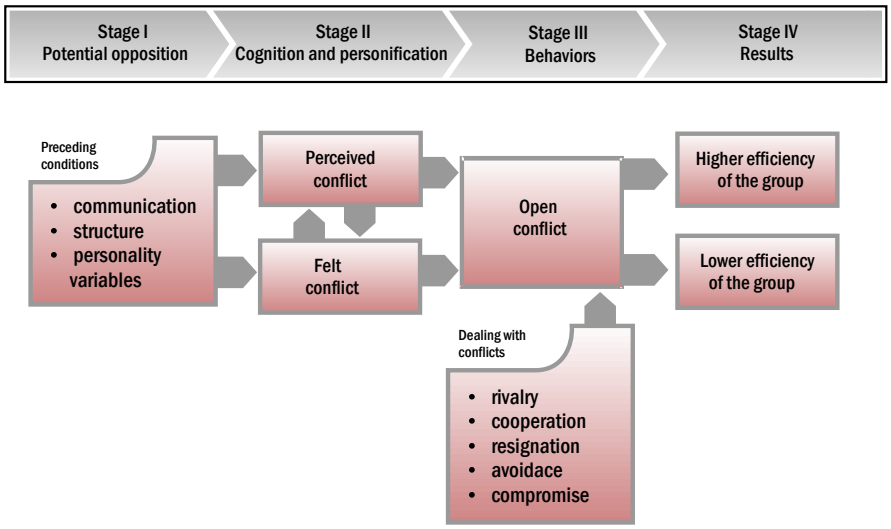

Figure 2.6. Course of conflict. Prepared on basis of: Robbins, 1998, p. 295

In the first stage of conflict conditions of its occurence, including three categories of variables, are being defined: communications, structural and personality.

Misunderstandings in the communication network can result from semantic problems, from interferences in the communications channel and from insufficient information exchange. It results from examinations quoted in literature that the potential of conflict is growing, when the communication is taking place in a too small or too great degree. Increasing the communication is functional only up to the certain moment; a too large quantity of information is destabilizing its' flow and this can generate decision-making problems and conflicts appearing one by one. Causes of conflicts largely lie in the human nature, but very organization is also their essential base, since it is extorting principles of cooperation and accommodation to existing decision-making processes on its members. A necessity of cooperation is often a sufficient premise for arising a conflict. People are dependent from themselves and this limits their freedom. They need to exchange information; they often must agree and coordinate their decisions and action. According to

[37] Robbins S., *Zachowania w organizacji [Behaviors in the organization]*, Państwowe Wydawnictwo Ekonomiczne, Warszawa 1998, p. 295.

the developed view of Webber[38] three main factors determine the possibility of occurrence of a conflict:
– necessity of sharing limited assets,
– incompatibility of purposes,
– interdependence of decisions,
– interdependence of actions.

The influence of incompatibility of purposes and bond of assets on the possibility of the appearance of conflicts was illustrated in the picture 2.7.

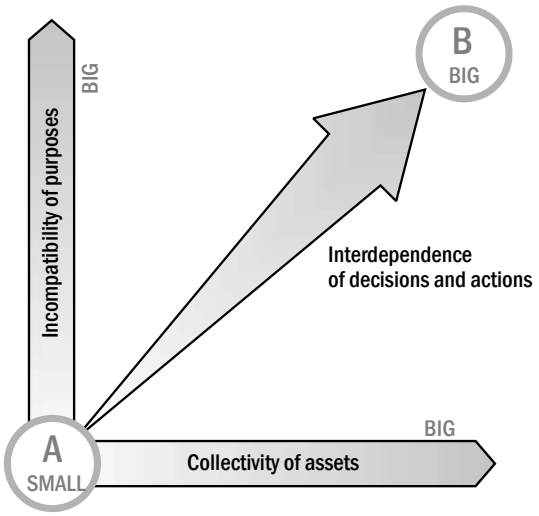

Figure 2.7. Possibility of appearance of a conflict. Prepared on basis of: Webber, 1990

The necessity of share assets results from essential rules of operation of the organization. Usually the organization cannot satisfy expectations of all members, groups, departments and divisions. The more limited are its assets, the more decisions (perceived as contradictory with objectives or unfair) appear and this can lead to a conflict. So, when people, groups or divisions function on basis of their own assets and decisions concern this particular closed environment, the possibility of a conflict is smaller[39].

[38] Webber R.A., Zasady zarządzania organizacjami [Principles of organization management], Państwowe Wydawnictwo Ekonomiczne, Warszawa 1990.
[39] Piotrkowski K., Świątkowski M., Kierowanie zespołami ludzi [Managing teams], Dom Wydawniczy Bellona, Warszawa 2000.

2.5.5. Decisions associated with dynamic conflicts

Differences in aims concern the functioning of individual persons within the organization. Employees realize tasks they have been assigned to and which are related with their goals and the company's mission. However, objectives determined by the company are not always coherent with their personal aims and aspirations. The bigger is this divergency, the higher is the risk of a conflict. It is possible to look at the dynamics of conflicts and perceive it as a hybrid model, consisting elements from the Glasl's Model Of Conflict Escalation[40] and elements of classification of conflicts on the basis of ways of revealing them. It has been illustrated on the figure 2.8.

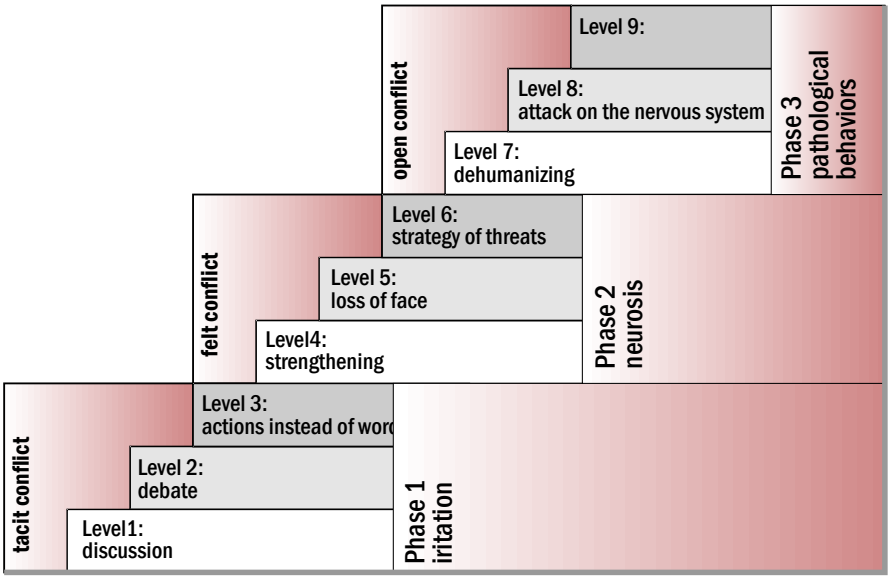

Figure 2.8. Hybrid approach to the course of conflicts. Personal elaboration

Described dynamics of conflict are facilitating diagnosing the stage on which it appears. It is essential to take the right decision concerning the strategy of solving it. Depending on, what level of the escalation in conflict is, ending it will be taking various forms.

– In the phase of irritation the most important purpose is to prevent the escalation of the conflict by early identification of his symptoms and making a decision about preventive action. Conflict being refrained by calming behaviours, relieving tensions, rebuilding relations, finding causes and symptoms of conflict.

[40] Fritchie R., Leary M., *Konflikty w przedsiębiorstwie [A conflict in a company]*, Petit, Warszawa 1999, p. 112.

Steering conflict consists on restoring positions enabling the relation to establish normals, limiting the most harmful behaviours, taking steps aiming at solving a problem and of the control of the circumstance of conflict in the destination of implementing the conciliatory element.

– In the phase of neurosis managing conflict consists in taking some planned and mutually tied together actions (establishing rules and determining borders, explaining roles and conciliatory steps).
– In the phase of pathological behaviours solving conflict requires of long-term strategy, including its various aspects and signs (managing the situation, appointing the time and essential means to solve it and establishing the structure of action including legal instruments).

The figure 2.9. presents methods of solving conflicts

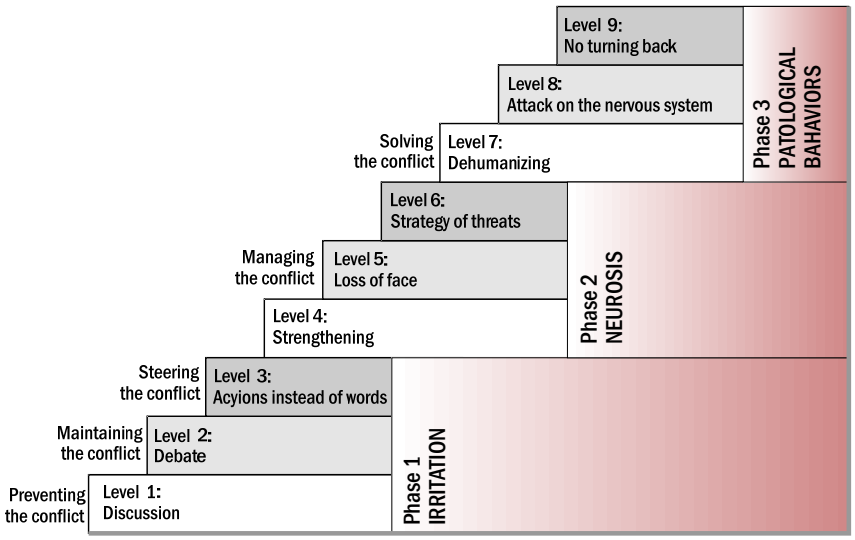

Figure 2.9. Methods of solving conflicts. Prepared on basis of: Frietchie, Leary, 1999, p. 79

Analysis of types of conflicts (-intra and inter personal, group and organizational) leads to taking different decisions that result in solving those conflicts:

– bringing balance in the organization by increasing integrating forces in the formal structure what can rely on increasing financial and moral stimuli and on taking organizational decisions that satisfy employees;
– leading to approval of the existing state through convincing employees about its rightness, e.g. from the point of view of the general interest of the organization;
– leaving an organization by the employee (the most radical form).

Conflict in the formal structure can be solved through decisions being taken in the unofficial structure of organization, e.g. through increasing qualifications in order to get more prestige. Another form of solving problems with use of un-fomal methods is organizing social meetings or circles of interests (outside the organization).

2.5.6. Methods of solving conflicts

The selection of methods of solving conflict depends from many factors, among others from attitudes of employees in face of a conflict. Following attitudes are being distinguished[41]: traditionalist, behavioral and interactive. The traditionalist approach is originating from the belief that conflict is bad and it is necessary to exclude it out. The behavioral approach is based on the assumption that conflict is an unevitable element of social life, as well aiming in solving it. The interactive approach is rising from the opinion about positive forces lying in conflicts. All approaches described above are presented in the table 2.4.

Table 2.4. Approaches towards conflicts and methods of solving them

Tradistionalist approach	Behavioural approach	Interactive approach
using force suppressing conflicts dragging away avoiding removing individuals responsible for conflict	mitigation arbitration research of common objective peacful coexistence compromise change of organizational structure	bargaining mediations negotiations increasing assets change of attitudes of actors confrontation of arguments trening of sensibility situational simulations managerial games

Prepared on basis of: Holstein-Beck, 1997, p. 140

[41] Holstein-Beck M., *Być albo nie być menedżerem [Be or not to be a manager]*, Infor, Warszawa 1997, p. 140.

Thematic questions for the chapter 2

1. List and discuss barriers in process of objective making decisions
2. List and discuss barriers in process of subjective making decisions
3. What is the uncertainty in the decision-making process
4. What is the risk in the decision-making process
5. Characterize the role of a manager In the process of making decisions
6. Discuss techniques of management and their influence on the process of making decisions
7. Characterize the difference between a manager and a leader and determine features supporting decisive processes In case of the first and the second one
8. How styles of conducting are combining with the decision making
9. In your opinion, how should be shaped characteristics of managers and in what order
10. Discuss bases of conflicts
11. What decisions should be made for solving conflicts In accordance with the model of escalator of conflicts of F. Glasl
12. Discuss the course of conflicts
13. Discuss attitudes towards conflicts and methods of solving them

Chapter 3
Support of decisions

Introduction

Making decisions in a turbulent environment, under strong pressure of time, has shaped instruments supporting the mentioned process. decision-makers that participate in the process can use dialogue systems, expert systems, as well as decisive games, which upgrade the quality and rationality of undertaken decisions and the process of deciding.

3.1. Decision Support System

DSS - Decision Support Systems have incurred as an expansion of management support systems (MIS – Marketing Information System) and they are, so to speak, their superstructure, supplement that functions as a set of procedures and methods of regular, planned collecting, analyzing and presenting information, which is used for making marketing decisions.

Marketing Information Systems are based on objective analysis of the style of making decisions being in the scope of competences of all managers. A following evaluation is being effected: types of decisions made by managers, information requirements, distribution of these needs in time and optimum format of the information. The Marketing Information System is most often characterized as:

> *a coordinated team of people, action and tools, linking with computer systems, which have purposes of production, storage and using delivered data by market researches.*

Appropriate composition and the system structure enables current supplying decision-makers with data essential for them and this makes the uncertainty and the risk of market action are much smaller[1]. Data is symbols transferred with help of carriers in the form of signs or of the combination of signs. Written, oral forms, tape recordings, video recordings can be the example[2]. The information is impor-

[1] Kaczmarczyk St., *Badanie Marketingowe. Metody i techniki [Market research. Methods and techniques]*, Państwowe Wydawnictwo Ekonomiczne, Warszawa 1994.

[2] Obtaining information from data is connected with a conscious action. A change of data into information will not take place if the machine will be the. The transformation is possible with use of induction, deduction, analysis and synthesis.

tant when it goes to an appropriate person, in proper time and place. The table 3.1 presents applications of MIS and DSS.

Table 3.1. Applications for MIS and DSS

Marketing Information Systems	Decision Support Systems
Standard formats of report Decision-makers must reveal information needs and decision-making processes Processing files in periods established from above Useful for structurized problems Models determined by the programmer	Flexible and revolutionary forms of report Users can change information needs and decision-making processes Interactive processing made in the real time Useful for poorly structurized problems The dialogue system enables managers describing models

Personal elaboration

Unlike MIS, DSS:

> ***DSS*** *serves mainly for solving unstructurized or poorly structurized problems.*

Supporting the process of thinking and raising the effectiveness of the decision are main tasks of DSS, rather than the efficiency and the speed of for its taking. The computerised system of supporting the decision allows the decision-maker using data and models for the diagnosis, understanding and formulating the problem. It also supports creating models of solutions, enables multidirectional forecasts and analyses of their effectiveness, which are essential for evaluating variants and selecting the optimum one, i.e. making a decision.

Following functions of systems of decision support are fundamental[3]:

- databases management;
- presenting results in an appropriate form (most often graphical);
- analysis and the structuralization of the model;
- structure of the mathematical model of solutions to the problem;
- techniques and statistical models;
- prognostic and simulation models;
- learning – keeping created models and solutions to problems.

Decision support systems increase the efficiency of decisions, they allow the manager to have a wider scope to the problem, they enable making simulations of effects of different variants of the decision and the influence of various scenarios of development of the situation in the company's environment – reactions to decisions that have been made. The marketing information system is including market re-

[3] Kisielnicki J., Sroka H., *Systemy informacyjne biznesu [Business information systems]*, Agencja wydawnicza – Placet, Warszawa 1999.

searches in its scope. They are an element of the system, and a planning, collecting, analysis and the presentation of data obtained from different sources and collected with different methods are their function[4].

Properly prepared and interpreter information, with widely comprehended market conditionings of the enterprise are next going to particular levels of management, depending from the organizational structure and information needs of managers. So, the system's objective is generating reports of a correct quality from one side and constant reading out changeable needs of users of the information – from the other side[5]. Peculiarly essential is flexible responding to the changeability of the scope and the subject of data provided to different managers and adapting methods of examinations to expected results. Effectively application of the Marketing Information System (MSI) should have following features[6]:

1. It should provide the optimum amount of information in accordance with needs after analysis and aggregation of data.
2. Users and suppliers of the information must be conscious of taken decisions and should know information needs of every stage of the decision-making process, which are:

– subjective analysis of the market with special taking into account direct contacts;
– It is necessary to observe behaviors of participants of market relations, who dominate In the structure of general turnovers or who are standing out with particularly a low level of prime costs or with the most up-to-date technology of production;
– An evaluation of current and perspective needs of selected groups of customers – recipients and analysis of potential changes of the effective demand.

The economy based on knowledge and information technology requires permanent recognizing market signals, particularly in area of changes of the preference of consumers and the possibility of income groups of recipients. Determining conditions of choice of individual instruments in view of distinguished market segments and possible correcting exploited forms of the promotion or distribution channels are necessary. Permanent monitoring of the market economic situation and structures of the market is also important. It relies on taking under consideration macroeconomic conditioning in behaviors of participants the market, on evaluating the most important subjective occurrences (mergers, bankruptcies, concentrations) and of objective aspects. In this analysis specifying potential market relations (forms of distribution) and directing the enterprise into more beneficial trade and financial relations is also crucial in this situation. The very process of creating the marketing

[4] Mantura W., (ed.) *Marketing przedsiębiorstw przemysłowych [Marketing of industrial enterprieses]*, Wydawnictwo Politechniki Poznańskiej, Poznań 2000.

[5] Ibid.

[6] Kaczmarczyk St., *Badanie Marketingowe. Metody i techniki [Market research. Methods and techniques]*, Państwowe Wydawnictwo Ekonomiczne, Warszawa 1994.

information system should be ordered up in accordance to the logical and functional schedule.

The management should begin with analysis of own information needs resulting out of necessity of current managing and planning in the company. A diagnosis of the potential of the company in the material and immaterial aspect and predicted chances of developmental related to the enterprise's vision should be a base of such analysis. The second step in the process of MIS construction is organizing the flow of outside and internal information to the point of collecting and processing it. Permanent, periodic or occasional (cyclical) access to source data for persons responsible for the marketing information provides a possibility of selecting it, and making intentional selection and adaptation to individual users.

The next stage of the structure of the system is regarding proper converting source data and including them into services appropriate to needs and users (marketing reports). Their last analysis and interpretation are becoming a task of managers which are supplementing premises of making a decision with the MIS knowledge.

The last phase of functioning of the system is applying its elements in the decision making process by considering result of market research, analysis of the market and the strategy of the enterprise in operational management and long-term changes of the structure of production and assets in the company.

Choice of the appropriate decision-making variant results in the size of sale, the share in turnovers of the market and the changeable competitive position[7]. The management is systematically assessing these marketing parameters and is correcting his decisions to the purpose of improvement of efficiency of the management. The functioning of MIS is presented on the figure 3.1.

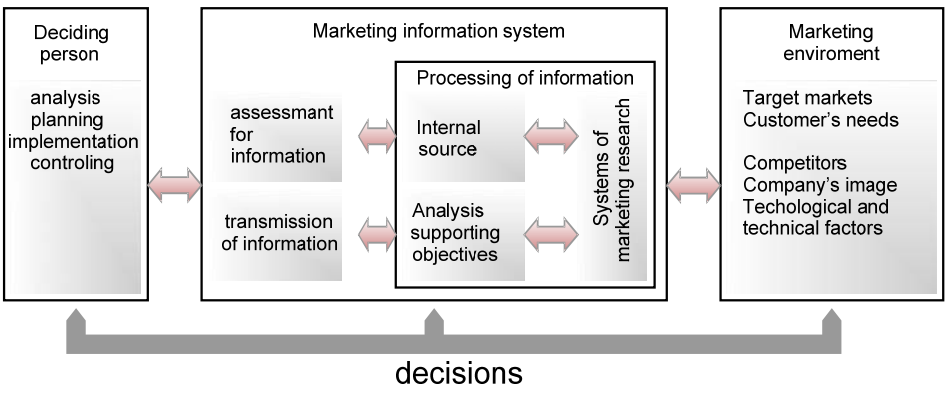

Figure 3.1.Marketing Information System. Prepared on basis of: Mantura 2000

[7] Mantura W., (ed.) *Marketing przedsiębiorstw przemysłowych [Marketing of industrial enterprieses]*, Wydawnictwo Politechniki Poznańskiej, Poznań 2000.

3.2. Expert systems

The idea of expert systems is inseparably associated with artificial intelligence (AI). The artificial intelligence is a new interdisciplinary field of science and an object of great expectations and heated debates. In the theoretical meaning AI is an area containing issues from field of computer science, psychology, anthropology, mathematics and of philosophy. The so-called applied artificial intelligence is dealing mainly with creating the equipment and providing software imitating man in its way of thinking. The objective is to create a machine that would be able to solve problems, which the majority of people finds as requiring a certain intelligence, which is defined by Webster as follows:

> ***Intelligence*** *is an ability of the learning and understanding phenomena through experience, an ability to acquire knowledge and apply it for the purpose of fast effective reacting to new situations; powers of reasoning for effective solving problems.*

Discussion on what he is AI with and what isn't lasts up till today. Majority of those, who are dealing with the artificial intelligence has his own opinion about what AI consists, what its tasks are and which tools so far described and created, we are ranking among it.

Quoting only chosen out of these subjective views, Millar notices, that „in the last years a fact that people and computers are simply two all sorts kinds of the same kind, called „ was accepted with information systems" has been accepted as certainty", Feigenbaum[8] suggests that "the real objective of artificial intelligence is the ability of instructing the computer of what he should do, instead of – how should he do it". Finally AI was defined as „everything, what people did not yet …"

The multitude of definitions of the artificial intelligence is the source of discussion and the confusion in literature. However, it is possible to point out common items in them. They are all concluding that an ability of "learning" is an essential AI attribute.

Methods of solving a problem from the AI family are applied where it isn't possible to solve a task in a "purely analytical" way and where it isn't possible to find of deterministic model of the phenomenon.

Spectrum of issues, being in the range of interests of the artificial intelligence in its general approach, is very wide at present. On the basis of chosen sources below only some of them were exchanged[9]:

---

[8] Feigenbaum, E., *A Personal View of Expert Systems: Looking Back and Looking Ahead*. Knowledge Systems Laboratory, April, 1992.

[9] Osowski S., 1996, *Sieci neuronowe w ujęciu algorytmicznym [Neural networks in the algorithmic approach]*, WNT, Warszawa 1996.

– *expert systems*.
– *automatic programming*.
– *knowledge representation*.
– *machine learning*.
– *natural languages processing, comprehension, translation*.
– *problem solving, control and search methods*.
– robotics.
– *perception, computer vision, speech recognition*.
– *scheduling and planning*,
– other.

One of many tasks performed by characterized tools is assisting making a decision. Expert systems are among others such tool. One of AI progenitors, Feigenbaum[10] defines an expert system as:

> *An intelligent computer program uses procedures of concluding for solving problems which are difficult enough, so that they require a significant expertise of specialists*.

Today we interpret an expert system as computer system containing a specialized knowledge about a defined area of human activity (like: medicine, technical diagnostics, financial analysis, etc.). The knowledge in the system is organized in a way, so that it enables an interactive dialogue with its user. An expert system offers advices or particular decisions that must be taken in a situation determined by the user, if appropriate data are entered. From this point of view expert systems are systems supporting the process of making decisions.

It is possible to classify a computer program in the class of expert systems, if it consists of a few basic components:
– module of obtaining data and knowledge,
– bases of knowledge ,
– interface of the user,
– concluding mechanism .

Two elements are deciding on the strength of the expert system: the base of knowledge and the concluding mechanism. So, an expert system consist a recorded knowledge of the expert (or a team) from particular domain. The knowledge base is a set of facts and rules. Facts are most often written in the form of indicative sentences, however rules have the form „if … – then…" and constitute the core of knowledge base. They can be put by the expert in, as well as they can be extracted from examples of decisions of the expert with help of different techniques of supporting decisions (and this situation occurs most often).

[10] Feigenbaum, E., *A Personal View of Expert Systems: Looking Back and Looking Ahead*. Knowledge Systems Laboratory, April, 1992.

Typical functions realized by the expert system are:
advising, analysing, classifying, giving information, diagnosing, collecting experience, forecasting, planning, testing.

It is possible to classify expert systems according to different criteria.

On account of the way of shaping them is possible to divide expert systems in two basic groups[11]:
– dedicated,
– skeletal.

Dedicated systems are being realized from the basics. Their application is usually limited to an narrow area. They can be created with use of different programming languages.

Skeletal systems are in principle an environment for construction of expert systems. They don't have any base of knowledge that could be used. It is possible to call them expert systems with empty base of knowledge, which is being filled along the process of implementation of the system for the purpose of particular application. They have the major advantage, that they significantly shorten the time of creating an expert system because they reduce this process to the time spend on creating a knowledge base.

And so advantages of the skeletal system are that it contains[12]:
– mechanism for the formal representation of knowledge,
– tools for the structuralization of the base of knowledge,
– built in mechanism of concluding,
– interface suitable for creating the expert system,
– the possibility of constructing and developing the base of knowledge, also for the final user,
– tools for controlling the correctness of the base of knowledge.

At creating the expert system it isn't necessary to know the language, in which the skeletal system has been written.

Table 3.2. presents the basic classification of expert methods.

Table 3.2. Classification of expert systems

Criteria of classification of expert systems	
Method of the process of concluding	**Type of the processed information**
With bivalent logic	Systems with the certain, i.e. determined knowledge
With polyvalent logic With dispersed logic	Systems with the uncertain knowledge in which processing the probabilistic apparatus is being exploited

Personal elaboration

[11] Ibid.
[12] Ibid.

Expert systems found the wide application in many fields. Typical areas of their implementation are: medicine, management, agriculture, robotics, technical diagnostics, electronics (and many other). These are most often fields, in which algorithms of the decision making are poorly formalized and it is hard to use rigorous methods of action in them. Expert systems are mainly having an advisory role. It means that they present to the user a solution, which is able to assess the quality of this solution. The decision-maker can reject the solution offered by the system. In such cases we speak about expert system with the decision-maker.

It is possible to find expert systems without the control of the man. Then, they play the role of systems that are steering objects without participation of the decision-maker or with his reduced participation.

Expert systems in areas related with management have mainly found applications including following aspects[13]:

– classification – basing on premises there is being obtained a result, a definition of the state or class, in which particular object the object belongs (for example medicine – MYCIN)
– planning – seeking the arrangement, but often searching for order of elements (aeronautics – GATE)
– forecasting – basing on existing data there has been predicted the future state (management, environmental engineering).

3.3. Game theory

3.3.1. Notions and area

Game theory – defined as the theory of making decision in interactive conditions (strategic game) or in other words as mathematical theory of conflictual situations – it has been created by J. von Neumann[14].

> *Von Neumann has determined the issue of the game not by trying to preview intentions of the player, but by hiding own purposes*.

The committee of the Nobel Price has often recognized scientific work from the range of game theory and its applications[15]. Simon has obtained the price in 1978 for his contribution to the development of the evolutionary games theory and for the conception of bounded rationality. He has gained appreciation for the crucial

[13] Mulawka J.J., *Systemy ekspertowe [Expert systems]*, Wydawnictwo Naukowo Techniczne, 1996.

[14] *Theory of Games and Economic Behavior*, initiating the development of the game theory.

[15] http://pl.wikipedia.org/wiki/Nagroda_Nobla#Historia

research on the decision making process inside economic organizations and theory of undertaking them. J. Nash, R. Selten and J. Harsanyi have received this price in 1994 for the development of the game theory and its application to the domain of economy. In 1996 W. Vickrey and J. Mirrlees obtained the price for creating models of tenders and studies of conflicts with an asymmetrical information of participants.In 2005 Th. C. Schelling and R. J. Aumann received the Nobel Prize in the field of economics for applying the games theory in social sciences and microeconomics associated with the issue of solving conflicts. In the year 2007 the Nobel Prize in the domain of economy went to L. Hurwicz, E.S. Maskin, R.B. Myerson for further applications of the game theory in this area.

The decision theory, as well as the game theory, examine methods of making optimum decisions in various situations, although both determined areas of science differ significantly from one another. The trump difference is that in the game theory struggle taken by participants is affecting remaining players (when they make a decision about the choice of strategy of action taking into account those interactions). In the theory decision decisions can be made in conditions of risk or incertitude but they don't depend from strategic actions of someone else than the decision-maker himself.

Basic components of each situation, in which the phenomenon of competition and interrelation is appearing in the decision making process, are[16]:

1. *Players and their movements*. There are at least two players on the market. Their actions concerning investment, marketing, production and prices are mutually dependent from each other.

2. *Results and payoffs*. The score of the rivalry determines action of all players (it is called the value of the game). Each potential result refers to a determined payoff, which is the measure of the degree of the achievement of the objective of each of rivals; most often expressed monetarily in the case of an enterprise and with use of the value of usability – in case of the consumer.

3. *Rules of the game*. Players act in accordance to formal and informal rules of the game. Those can be legal regulations, commonly accepted principles of competitiveness and corrupt practices or hostile takeovers, as well as the resource of analytical knowledge enabling to keep up with competitive behaviors.

Every analysis of the competition referring to achievements of the games theory, has as its point of departure, is a description of players, strategies they apply, payoffs understood as the plan of action, taking all possibilities into account and get by each of them.

[16] Poundstone W., *Prisoner's Dilemma: John Von Neumann, Game Theory and the Puzzle of the Bomb,* Doubleday, New York, 1992.

The rivalry can have character of the one-time move or many action continuing in time (sequential and repeatable competition).

Games can appear in the strategic and extensive version. From the formal side it is possible to define the finished strategic game as follows: set of players: $I = \{1, ..., N\}$,

- set of actions (movements): $A = \{A_1, ..., A_N\}$, where each element $A_i = \{a_i^1, ..., a_i^k\}$ is a set of moves available for i-player. every player Has potentially a different set, so the number of available actions k_i is generally various from the i,
- set of functions of payoffs: $\prod = \{\pi_1, ..., \pi_N\}$, where each element π_i is assigning a numerical value to the score of the game. If the score of the game means actions taken by player, then: $a = (a_1, ..., a_N)$. The element of his set (profile), $a_i \in A_i$, means a determined realized action (decision) of the player i.

A dominating strategy is the best possible reaction to the any strategy applied by the competitor. Its logic inevitably leads to worsening the result, if only the game has a non-cooperative feature. A dominated strategy is an opposite of the dominating strategy. It takes place when the player has a strategy giving him the pay-out irrespective of, how his competitor will play.. A prisoners' dilemma is an example of such non-cooperative game. *A prisoners' dilemma* is the most famous example of the games theory. It is realized on basis of a two-persons game with a non-zero sum, in his game each participant can gain something if he betrays the, but they will both lose if they betray themselves. The prisoner's dilemma Has Ben worked out by M. Dresher and M. Food in 1950. A.W. Tucker has formed its rules and He was the first who used the name *prisoner's dilemma*[17]. In its classical form, the dilemma is being shown as follows[18]:

Police has arrested two suspects. Not having satisfactory evidences for bringing charges, prisoners were separated and the same offer has been presented for each of them:

1. *if one will testify against the other prisoner and he will remain silent, the testifying one will be released and the silent one will get the ten-year sentence .*
2. *if both prisoners will remain silent, they will both get a one-year sentence for other offences.*
3. *if both prisoners will testify, they will both get a five-years sentences.*

Each of them must make a decision independently and none will learn whether second is silent whether he is testifying all the way to the moment of hearing a sentence. And so how should they act? If we will assume that each of prisoners prefers the shorter sentence than longer and none cares about the low sentence of the other one, we can describe this dilemma in terms of the games theory. then prisoners play the game, in which acceptable strategies are as follow: cooperate

[17] Poundstone W., *Prisoner's Dilemma*, John von Neumann, Game Theory, and the Puzzle 1992 of the Bomb, Doubleday, New York 1992.

[18] Ibid.

(be silent) and betray (testify). Each player wants to maximize his profits, i.e. gain the shortest sentence possible.

In this game the option "betray" is a strictly dominative strategy: independently from what will the another prisoner do, it is always more beneficent to betray than to cooperate. If the fellow-prisoner is silent, cheating will shorten the sentence from six months to naught. If the fellow-prisoner is testifying, cheating will shorten the sentence from ten to five years. Each rational player will betray and the only balance of Nash is in a situation, when both prisoners betray. In result they both gain less than they could have if they would both cooperate. Following tables present decisive problems of arrested and prisoner persons.

Problem of the prisoner's dilemma A

Actions A	**Actions B**	
	not to plead guilty	**betray the mate**
not to plead guilty	1 year	10 years
betray the mate	0 year	5 years

Problem of the prisoner's dilemma B

Actions B	**Actions A**	
	not to plead guilty	**betray the mate**
not to plead guilty	1 year	10 years
betray the mate	0 year	5 years

Game consisting two prisoners

Actions A	**Actions B**	
	not to plead guilty	**betray the mate**
not to plead guilty	1 year 1 year	10 years 0 year
betray the mate	0 year 10 years	5 years 5 years

Formally, the two-persons prisoner's dilemma is being applied as follows: I = {1, 2}, A={A_1, A_2}, A_1 = {to not confess, to betray the fellow-prisoner}= {NC, BFP} = A_2. Combinations of action of both arrested are a score of the game, i.e. a = (BFP, BFP), b = (BFP, NC), c = (NC, BFP), d = (NC, NC), and functions of payoffs$\prod$ = {π_1, π_2}. The function of payoffs is assigning numerical values to every result. For example, π_1 (a) = 5, π_2(c) = 0. The interpretation of results is going beyond issues of economics many times.

Balances.

Strategies guaranteeing the balance are strategies where the rate to penetrate the market or increasing the market share should be applied, when competitors are

making a decision irrespective of themselves and where there is no conspiracy between them. Then they are a reflection of the optimum reaction of both players, i.e. they enable maximizing the amount of the payoff of each of them in conditions determined by the selection of strategy that has been made by the opponent.

A state of balance is the best result that can be expected by a player participating in a zero-sum game against a rival that has an identical attitude. If one of player would resign from realizing a strategy leading to the state of balance, he would reduce the size of his own payoffs and he would allow the growth of payoffs of his opponent.

An occurrence of several states of balance is a case of even simplest negotiations that can result by an optional distribution of profits caused by a particular state of balance.

Strategies containing combined elements of competition and cooperation (fight of sex in marriage), are strategies in which enterprises are competing with the help of prices, patents, expansions of the production potential cooperating simultaneously at creating quality standards, mergers and entry barriers. The essential issue of those strategy consists in confrontation of two interests (arguments) assisting an identically formed objective; in result two points of balance occurs and the potential selection takes place through the process of negotiation.

Such problem can be described as a finished extensive game, which formal image is being presented as follows:

- a set of players; $I = \{1, .., N\}$,
- a set of strategies: $S = \{S_1, ..., S_N\}$, where each element $S_i = \{s_i^1, ..., s_i^{ki}\}$ is a set of actions available for particular player i. zbiórkach player Has potentially a different set, so the number of available actions k_i is generally various from the i,
- a set of functions of payoff: $\prod = \{\pi_1, ..., \pi_N\}$, where each element π_i assigns a numerical value to the score of the game. If the score of the game means strategies accepted by players, then: $s = (s_1, ..., s_N)$. The element of this set (profile), $s_i \in S_i$, means a particular strategy accepted by the player i.
- the tree of the game, which includes the initial top, decisive tops, final tops and branches combining the top with its consequences,
- rules determining, which player is making decisions in the given decisive top and what actions are available for him, what payoff players receive in the given final top.

The non-cooperative extensive game Γ_e is recorded as $\Gamma_e = [I, S, \prod]$.

And so it is possible to also describe scaring off from the entry as an extensive strategy. The existence of potential competitors is extorting the defense of the hitherto monopolist, and the potential competitor must take this reaction into consideration.

Thematic questions for the chapter 3

1. Characterize the Marketing Information System
2. Characterize the functioning of Decision Support Systems
3. Suggest areas of the application for MIS and DSS
4. Define the term of an Expert System
5. Enumerate and describe two fundamental groups of expert systems
6. Define the Game theory
7. Enumerate and describe fundamental elements of relations in accordance with the game theory
8. Describe the prisoner's dilemma

Chapter 4
Place of games in the process of making decision

Introduction

In the process approach, making decisions can be improved through trainings and games. A game; as a form of improving decisions that has been made, as well known for centuries. The history of games over centuries includes table games, war games, strategic games, managerial games and their compilations. Games have been created mostly in order to educate through fun, to train the sensibility and attention, to shape patterns of behaviors and verify ideas for solutions for problems presented in games. The games' purpose will be realized, when its scenario represents a model of a particular reality and when the participation in the game gives satisfaction to players.

4.1. Games from a historical perspective

The mankind since times of caves daubs knew games as a form e.g. of training in hunts, or ritual ceremonies, etc. The development of games is closely associated with the development of civilization, particularly with military actions, running wars and fights. Simulation war games are direct ancestors of managerial games. Their wide spreading took place after 1824, when „Kriegsspiel" of Reisswitz'es was led into compulsory use in the Prussian army[1]. Seeking ancestors of managerial games one should remember that they are:

***Games**, hence their relatives are other games and plays, especially derivative and strategic ones;*
***Simulation games** – their relatives are other games of this type, including economical games;*
***Serious simulation games** – war, legal, industrial and political games are their predecessors;*
***Simulation models**, like algorithmic models e.g. computer*

A simulation game is a simulation model, which includes people playing roles and affecting the rest part of the model and getting knowledge concerning its structure. In contrast with games with rules, childlike derivative games aren't concern-

[1] Balcerak A., *Praprzodkowie gier symulacyjnych [Primogenitors of simulation games],* Szkoła Symulacji Systemów Gospodarczych, Antałówka 1997.

ing exclusively the human sphere. Mammals and birds are also playing. Sociobiologists and ethnologists perceive derivative games as an important element of training. In gathering-hunting tribes, games imitating models of behaviors of adults enable children to bring under control all abilities necessary in the adult life, laws and ceremonies. Here, we should recall these games with the educational and tutorial value and contribution, which we can't overrated, to the development of our civilization has. Joy and nice way to spend time are main intentions of taking games by children. Such a justification for entering the play enables unwitting learning. Animals during games also learn rather particular skills icresing their chances to survive. Small chimpanzees are observing adult members of the flock using tools, then, when tools are being left, they try to reconstruct moves observed earlier[2]. There has been also noticed, that depriving two-year-old chimpanzees of the possibility of playing with sticks, is weakening much their ability to use them in the adult life[3].

The childhood in every historical time that we know was associated with ***playing roles*** *taken from world surrounding them.*

Every child imitating adults learns about social, economical and cultural relations through games. Playing *„the family", „the doctor", „the school"*, gives such possibilities. The interest of a child with derivative games is diminishing along his growth; hence it is not being totally supplanted and frequently is staying also in mature years. This enables engagement and autotellic participation in serious simulation games. Apart from serious games it is possible to find other types of serious simulations, preceding games and coexisting with them. It is possible to observe the evolution of games in the military sector, where they are expressed by deliberations conduced in word of imagination „if they will do … – then we will …"; similar deliberation are being performed in reference to the area of hypothetic confrontation, with use of maps, up to a full simulation game.

It is possible to distinguish two periods of serious games:

1. Classical era – from the most former times to about360 BC.
2. Modern era - since 1730 to present times, i.e. the end of the 20th century.

Time concluded between these ages – years 360-1730 weren't described in a way known today and there is no reliable information about applying serious games. In studies it is possible to find two circumstantial exceptions: playing parts of historical figures from the antiquity in years 782-814 by members of the manor house of Charlemagne and propaganda recommendations of Machiavelli concern-

[2] Komorowska J., *Uczłowieczanie małpy [Humanizing the Monkey]*, Wiedza i życie, nr 6, 1997.

[3] Ibid.

ing educating leadership abilities at the monarch[4]. The oldest notifications concerning specific games with playing roles concern following persons: Lucius Septimius Severus (145-211) and his games in judges, and Cyrus the Great (577-529) and his games in state[5]. Hence, a simulation game is an unstrained game when a part of reactions to actions of actors is freely adjudicated by man. Ancient simulations were examples of such games[6]: war games of Pyrrhus, Philopoemen, civil games of Cyrus the Great: AA-NN and Controversiae (described below).

Philopoemen (253-BC). He specialized in educating the army and commanders. He applied systematic exercises, starting from a single rider, by larger divisions, all the way to the entire ride, as well as cases studies (on historical examples). He used the methodology of games which at present are called war games[7].

De Cormontaigne's games they served appointing the length of time of resistance of a fortress (as well as its weak points) and became a part of the methods of assessment of fort projects applied in the Kingdom of France. They were applied in practice of fortification and as one of main teaching tools at the elite school of engineers of the army[8].

Etat exterieur (external state) – is an example of a political game recommended to Confederates of Bar. It is a copy of components of the Polish–Lithuanian Commonwealth Government. Determined institution has become an „incubator" of future „*statesmen*", who will occupy the same offices which earlier they held for fun in the game[9].

It is recognized that the oldest game of the word that has been fund until today is the game discovered in royal tombs in Ur, dated from about 2600 BC. There has been found an entire kit – the board, seven dark and seven light pawns and sets of six dices in form of pyramids, with triangle walls[10].

In board games the Chaturanga is recognized as the direct predecessor of chess. It originated in India, c. 3000 BC. It was a four-person game, it consisted of a board in the form of the chessboard 8x8, a throw with four-walls dice decided on the possibility of every move. It was played in pairs with pawns copying types of armies used in ancient India. *Wei-Chi* is an ancient, at present known under the Japanese name „go". It is played on the board in form of a net. Fields for pieces (181 black and 181 white) determine 19x19 lines crossing each other. The goal of

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[4] Ibid.

[5] Balcerak A., *Praprzodkowie gier symulacyjnych [Primogenitors of simulation games],* Szkoła Symulacji Systemów Gospodarczych, Antałówka 1997.

[6] Balcerak A., *Praprzodkowie gier symulacyjnych [Primogenitors of simulation games],* Szkoła Symulacji Systemów Gospodarczych, Antałówka 1997.

[7] Ibid.

[8] Ibid.

[9] Ibid.

[10] http://www.wynalazki.mt.com.pl/13.12.2009

the game is to occupy the biggest territory possible by surrounding (besieging) and capturing pieces of the opponent[11].

Hnefatafl – is a Scandinavian strategic, two-person' game known since the 4th century; it was player on a "chessboard" 11x11 or 13x13 fields. It was an asymmetric game, i.e. players had different, opposite goals. One player had 12 white pieces and one special piece, called „*hnefi"* (king); his opponent had 24 black pieces. First player aims to lead the king to the special field of the board, the second player should make it impossible and capture the king[12].

This game functioned in many versions, differing usually in the size of the board and the number of pieces. In Lapland existed *tablut* (fight between Moscals and Swedes), Saxon game *Alea Evangelii* (sea battle), in Irish sagas gods and heroes played *the wooden wisdom* (symbolizing the relation of man with hostile spirit world), Icelandic *halatafl* (relative of the game "fox and goats"), *senet* from ancient Egypt (game of the race type) and Hindu pachisi. Rules of the game that evolved from Chaturanga Has become popular in Iran, it enraptured Arabs and thanks to them it appeared in Europe in the 9th century, where it has passed much transformation over the centuries. Only by the turn of the 15th and 16th centuries; rules of chess begun to be similar to modern ones. War chess is a game which developed from simple capturing pieces of the opponent to mating the king. Balcerak is seeking the causes of such a development of games in copying the change appearing in methods of running the war: the former fight, relying on fast gathering possibly big territory of the enemy and damage like the bulk of his armies was transformed into a fight of all sorts military groupings, which required the ability of commanding and coordinating activities of individual parts of the army[13]. In this situation capturing or killing the commander-in-chief, and mainly the king or a master was the one+, was tantamount to the victory. Therefore chess has also evolved from simple elimination of opponent's pieces to the goal of cornering the king.

Genealogy of simulation managerial games reaches much farther, than to the genesis of serious war games. Both these types of games have the group of common ancestors. It is possible to distinguish four periods in the modern era[14]:

1) Royal, 1730-1795
2) Napoleonic, 1786-1824
3) Prussian, 1824-1957
4) Mass, 1950-1957.

Playing and competing as well as playing roles result from natural tendencies of the man. It is manifesting itself in childlike derivative games and playing social strategic games. In the ancient history there are many cases of activating training

[11] Ibid.
[12] Ibid.
[13] Balcerak A., *Praprzodkowie gier symulacyjnych [Primogenitors of simulation games]*, Szkoła Symulacji Systemów Gospodarczych, Antałówka 1997.
[14] www.ioz.pwr.wroc.pl/13.12.2009/pietron

and educating, also with use of simulation methods, for which it is possible to determine maneuvers, analyzing cases, rhetoric exercises for lawyers. Their effectiveness, certified with continuity of applying, facilitated approval of simulation games as teaching methods. Many serious war or political games were created in the past. Therefore until the Reisswitz's game (1824), those games were not popularized or they were used only in narrow circle[15] because they required big involvement. Free simulation serious games are older than „stiff war games". However war stiff games became pioneers of popularizing this method. Free games in Oelsnitz style could be conduced by people of proper rank. The Cormontaigne's game was the first known case of introducing the element of economy to the model of the game. His allows stating that since year 1786 entrepreneurs, merchants and bankers had games at their disposal[16].

4.2. The term and features of games

The term „*game*" can be fund in the literature of many Romains, starting from historical descriptions, through pedagogical texts and ending on managerial workshops. The notion „game" is balancing on the order of study and play, so it contains elements of both in it. However, distinguishing the play from the game still causes quite a lot of problems. Getting acquainted with different interpretation of these notions will facilitate their classification and application. Using wide studies of Balcerak (2001, 2002, 2005), authors are presenting a few notional characterizations concerning games and plays.

> *„... **games and plays** aren't taken hold into rules and all at the same time fictional", although, in the same time he admits that „the rule itself create a certain fiction".*

„*Fictional*" games are interpreter as games without formal rules but requiring from its participants to accept certain roles and having some empathy of "*the secondary reality*". Brougère interpreter it differently; he claims that the definition of a „system of rules" doesn't mean strictly formal rules that a participant learns before he starts the game; it means also potential patterns of solving the issue[17]. The table 4.1 presents several definitions. According to Caillois[18].

[15] www.ioz.pwr.wroc.pl/13.12.2009/pietron

[16] www.ioz.pwr.wroc.pl/13.12.2009/pietron

[17] Radosiński E,. Balcerak A., *Zabawa, wojna zarządzanie, Historia powstania i rozwoju gier kierowniczych [Play, war management, Genesis and development of managerial games]*, in: (ed) Radosiński E., *Modelowanie symulacyjne w dydaktyce ekonomii [Simulation modeling in didactics of the economy]*, Polskie Towarzystwo Symulogiczne, Wrocław-Kraków-Gliwice, ss. 9-26.

[18] Ibid.

In described expressions a trademark appears „detachments from the everyday life" and „disinterestedness's" of games. These features can raise doubts. Juul[19] finds that results of the game depend from the attitude of the player, who can play in a way that can have a big, medium, or small consequences in the real life.

Balcerak underlines another essential feature of games i.e. its voluntariness. However, the fact of presence of rules and their practical character often disturbs the voluntariness and sense of joy in the game.

Table 4.1. Characteristics of chosen notions of games and plays

Characterystic	Definition
J. Huizinga, 1938[20]	*„The play is a voluntary activity or occupation, effected in certain established borders of the time and space according to rules voluntarily adopted, but unconditionally being in effect, it is a purpose itself, whereas feeling of tension and joy and the awareness of 'difference' from 'common life' is accompanying players. „The play is a fight for something or presenting something and it has no moral function, it is not a virtue, or a sin."*
R. Caillois, 1958[21]	A game (…) doesn't produce any goods or works (Gambling games, bets or lotteries as well because they do not produce any wealth, they just cause their transposing."
G. Brougère, 1997[22]	*„A game (...) is series of events provoked by the distinguished decision-making system created by the system of rules, particular time and place".*

Prepared on basis of: Balcerak, 2001

According to Huzing the definition of a game consists following characteristics[23]:

1) It is singled out from the sphere of the common life. „*It is player within determined limits of time and place*".
2) It is a free activity. „*An ordered play is not a play no more. It might be a reconstruction of play at most*".

[19] Balcerak A., *Praprzodkowie gier symulacyjnych*, Szkoła Symulacji Systemów Gospodarczych, Antałówka 1997.

[20] Huizinga 1985, after: Balcerak A., *Praprzodkowie gier symulacyjnych*, Szkoła Symulacji Systemów Gospodarczych, Antałówka 1997.

[21] Caillois 1997, after: Balcerak A., *Praprzodkowie gier symulacyjnych*, Szkoła Symulacji Systemów Gospodarczych, Antałówka 1997.

[22] Radosiński E,. Balcerak A., *Zabawa, wojna zarządzanie, Historia powstania i rozwoju gier kierowniczych*, in: (ed) Radosiński E., *Modelowanie symulacyjne w dydaktyce ekonomii*, Polskie Towarzystwo Symulogiczne, Wrocław-Kraków-Gliwice, pp. 9-26.

[23] Ibid.

3) It is voluntary „*It is beyond a direct process of fulfilling necessities and desires, it can even step his process"*.
4) It is being performer in accordance to determined rules. "*Facing rules of a game or a play any type of skepticism is impossible. (...) When rules are being broken, the word of game is being destroyed, his means the end of a play or a game*".

> ***A game is a sort of play**, consisting in respecting closely established rules, accustoming for obeying these rules...*[24]

Crucial features of a game distinguished by Radosiński and Balcerak can be described as[25]:
1) Distinguishing. The game is closed in determined limits of time and space.
2) Voluntariness: „*the person that plays can't do it because it is his duty"*.
3) Incertitude: „the course or the result of the play or game cannot be known from the start".
4) The unproductiveness determines that there is no final product.
5) It is shaped into standards or it creates a certain fiction.

The literature of the subject presents also other approaches of important features of a game, Brougère enumerates following ones[26]:
1) It is running „in brackets" of everyday life; it has a determined place and time.
2) It has rules which can result from outside regulations obeyed by participants of the game, from conventions accepted by them or from negotiations.
3) Provoked events remain in the game without the influence on the normal life.
4) The score of the game cannot be decided from above.

Analysis of the expressions included in the table 4.2 concerning games and plays allows to point as crucial their following features:
– singling out from reality („everyday life");
– voluntariness;
– presence of rules or conventions;
– a source of satisfaction and pleasure;
– unproductiveness (in a peculiar meaning distinguishing a game or a play from work; it isn't excluding the possibility of conveying property and gaining knowledge and skills);
– incertitude.

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[24] Okoń W., *Słownik pedagogiczny [Pedagogic dictionary]*, Wydawnictwo Naukowe PWN, Warszawa, 1981.

[25] Radosiński E,. Balcerak A., *Zabawa, wojna zarządzanie, Historia powstania i rozwoju gier kierowniczych*, in: (ed) Radosiński E., *Modelowanie symulacyjne w dydaktyce ekonomii,* Polskie Towarzystwo Symulogiczne, Wrocław-Kraków-Gliwice, pp. 9-26.

[26] Ibid.

In „narrow" definitions of the game a presence of rules is most often an indicated feature distinguishing this activity from the play[27]:

- „A game is a system, in which a player engages himself in an artificial conflict determined by particular rules and which ends with a determined measurable result"
- „*A game* is simply a total of rules describing it"
- „heterotelic actions (like competition) with a character of negative cooperation, performer in accordance to certain agreed rules."
- „A game is an action of two or more independent people making decisions, who tempt to obtain their objectives in some sort of limited context.

From the other hand, definitions of a play underline most of all the element of freedom and spontaneity. Okoń also points at difference in sources of satisfaction of participants of games and plays:

> ***A game*** *is such play, in which clear rules limiting the sphere of "game illusion", a factor of rivalry is appearing, and its participants are deriving satisfaction from the achieved result, more than from the fact of the participation in the play itself*[28].

Huizinga and Caillois – authors of most frequently quoted games' definitions claim that it is difficult to find clear criteria distinguishing those terms, mainly because of their natural language of communication (lack of separate names for "the game" and "the play"). Caillois[29] proposes a classification of games and plays depending on the attitude dominating amongst their participants.

This enabled creating four basic categories: *agon* (dominance of rivalry), *alea* (dominance of trust in the chance), *mimicry* (dominance of imitation), *ilinx* (dominance of daze) and combinations: *agon-alea, agon-mimicry, agon-ilinx, alea-mimicry, alea-ilinx, mimicry-ilinx.* While Caillois discovers that two poles in a set of games/plays[30]:

- *paidia* – where dominate entertainment, jaunty, improvisation and impetuousness;
- *ludus* – where the need of unselfish effort is revealing itself; of getting purposes and, in addition, following a convention. The description of basis is presented in the table 4.2.

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[27] Salen K., Zimmerman E., *The Game Design Reader A Rules of Play Anthology* 2005, p. 78-98.

[28] Okoń W., *Zabawa a rzeczywistość*, Wydawnictwo naukowe PWN, Warszawa 1987.

[29] Balcerak A., *Gry symulacyjne serio – w poszukiwaniu "typu idealnego"*, Szkoła symulacji Systemów Gospodarczych, Warszawa, 2001.

[30] Ibid.

Table 4.2. Classification of games and plays, in reference to R. Caillois

Dominating element	Expectations of the participant	Character and examples of games / plays
agon	• demonstrating the advantage over rivals	Symetric games with a character of competition. Initiating them is related with cognition and alleged approval of functioning rules. *(Championships, sports, involving agility, board games and card strategic games).*
alea	• victory over fate	Games, in which dominate the chance. Their definition results from deliberations about chances for winning and aptitude to risk. (*Roulette, bets,, board and card lotteries games of chance*).
mimicry	• satisfaction from pretending, and playing a role, creating the illusion	The issue in such game is entering a fictional role and playing it according to own, accepted by participants' ideas. There are no clearly determined rules; they are being replaced by conventions. (*Childlike derivative games, masquerades, staging, shows*).
ilinx	• happiness, ecstasy, trance, emotions	Providing organic pleasure is their being. (*Dance, fast drive in a car, on skis, etc. carousel, jumps on the tether).*

Prepared on basis of: Balcerak, 2001

The figure 4.1 presents the influence of the dominating element of emotions on the classification of Games and plays.

Figure 4.1. Intensity of selected factors in the class of games and plays.
Prepared on basis of: Balcerak 2001

„So, the paidia group contains such jeux, which, for example would be explained as plays, and in the group called ludus – we would include games[31]". Unfortunately, none has a unique pattern – a key of qualifications of those categories, hence it is possible to point at characteristics, which intensity grows or is decreasing just enough is approaching to the thresholds between the game and the play. „The bigger is the importance of rules and the bigger is the share of result in the satisfaction, the more probable is that we deal with a game. The thing is determined as a play when rules are blunt or absent and satisfaction results rather from the participation, than from effects of it"[32]. In the activity of the type paidia alea has a small share, in ludus – ilinx. It is easy to notice an inferiority of the game versus the play, the transformation of first degree that conditions the transformation of the second degree: distinguishing the game from the play, which is related with searching, creating or accepting determined rules. Transformations of the first and second degree are presented in the figure 4.2, Balcerak[33] is warning from identifying games with plays and assigning to the association game – to – play a specific meaning: the play is an environment for the game, so it conditions it.

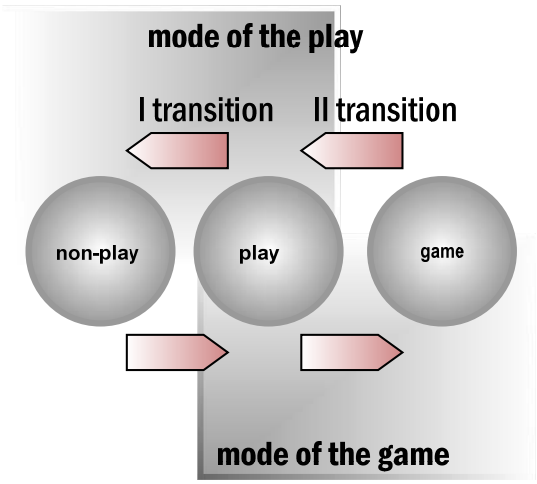

Figure 4.2. Play as condition of a game. Prepared on basis of: Balcerak 2001

Klabbers treats a game as a specific play and determines it as follows[34]:

[31] Balcerak A., *Gry symulacyjne serio – w poszukiwaniu "typu idealnego"*, Szkoła symulacji Systemów Gospodarczych, Warszawa, 2001.
[32] Ibid.
[33] Ibid.
[34] Ibid.

> ***A game is a form of play***. *It is an activity, in which one or more persons are engaged, they are playing certain roles and aim to obtain a particular goal. Rules determine behaviors that are allowed or they define limitations of permitted operations; this affects available assets and, in result, the state of the space of the game"*

4.3. Simulation game – term and typology

Simulation games are a part of a wider method of using the simulation, called interactive simulations. It consists in entering a decision-maker and changeable conditions into the procedure of the simulation (the model and/or simulations describing the environment). So, man is an element of a simulation model because – in a way he is biologically, functionally composed with the rest of the structure of a simulation model[35]. Such simulation is called a symbiotic simulation, also called a *soft simulation*. Simulation games use the competition between participants of the game (persons, teams).

> *If actions of a player have a character of making decisions – we name such games* ***decisive games****.*

A simulation decisive game is a simulation, in which occur people – participants, who make decisions within a simulated system, where following conditions are being fulfilled:
- there exist a determined goal of the game;
- there exists a determined dynamic model of the system;
- participants are parts of the model;
- there is a particular dramaturgy of form of rules included in the scenario of the game;
- there is someone running the game (a moderator or an arbiter);
- the game ends with its conclusion of the manager of the game.

> ***Simulation*** *is an examination of a subjective system (real or hypothetical) through observation of changes occurring in the dynamic model of this system under influence of changing internal and external conditions in relation to the environment*

[35] www.ioz.pwr.wroc.pl/13.12.2009/pietron

A simulation decisive game *is a simulation with an unlimited area of application, in which occur people-participants or a person-participant taking decisions within frames of the simulated system, according to certain rules; while which there is a particular determined objective of the game and former states of simulated objective system – real or hypothetic.*

- Simulation games by taking back to determined reality are comprising: objective system – a system that we want to know (reality);
- Real objective system - existing in reality;
- Hypothetic objective system - it isn't existing In reality;
- Model is a determined expression of interpretation of a theory concerning one or several hypothesis.

Simulations carried out in the objective system corresponding with reality are being subjected to the evaluation on basis of four fundamental criteria[36]. First is psychological realism determining the evaluation made by players and concerning the environment of the game that they consider as realistic. Second is structural validity. It is appearing when the simulation model is copying a real structure. A process validity is next, it occurs when processes observed during the game are accordant with processes observed in the objective system. Last is the validity of prospects, which allow assessing possibilities of reconstructing events from the past or forecasting the future ones.

The place of man in the game is a feature distinguishing a simulation game from other simulation models. The man is not only a user, but also a part of the model. In the simulation algorithmic model the man can be an element of the objective system copied as its fragment. Still, a *living*, thinking, feeling and remembering man is the user of the model and he is operating this model from outside. His decisions can affect the way of using the model, the duration of the simulation, the input values of system variables, parameters, etc. still, they don't enrich the model – unlike it happens in a simulation game. Playing the role has a conscious character and the role itself is a regulation and suggestion of the designer of the game. The figure 4.3. presents the placement of man in the game. The role itself (without participation of man) has no life, just like other elements specified in structural definitions of a simulation game[37]. Simulations through games are characterized with the presence of elements enumerated below[38]:

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[36] Balcerak A., *Realizm w menedżerskich grach symulacyjnych*, Metody Symulacyjne w badaniu organizacji i w dydaktyce menedżerskiej, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2008, pp. 251-268.

[37] www.ioz.pwr.wroc.pl/13.12.2009/pietron

[38] Balcerak A., *Gry symulacyjne serio – w poszukiwaniu "typu idealnego"*, Szkoła symulacji Systemów Gospodarczych, Warszawa, 2001.

– definitions of roles – description of situations, In which deciding persons will find themselves In the beginning of the exercise and definitions of operations and types of decisions that they can (or which they can't) take;
– scenario - description of the general situation in which roles are put;
– computational system – tools for transforming decisions and generating their consequence;
– roles and procedures formulating and limiting the activity of participants of the game.

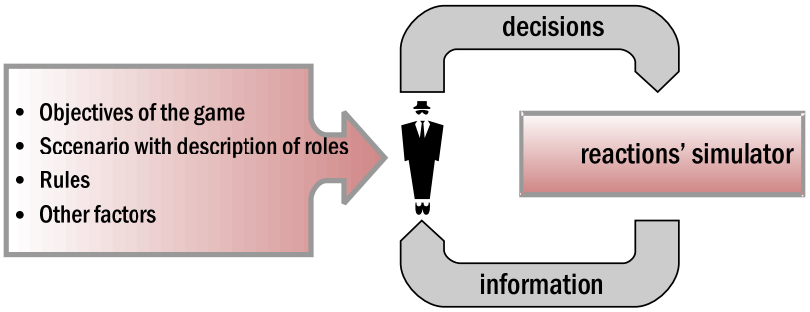

Figure 4.3. The course o fan individual stage of a simulation game and factors affecting the way of playing the role. Personal elaboration

A simulation game is a simulation model consisting following elements:
1) roles – they are player by participants of the game, each role in the game is determined by[39]:
   – showing the fragment of the original which the role is copying;
   – set of purposes to achieve in the games;
   – condensation of possible influences on the rest of the model, from which at least one influence is being chosen freely by the actor.
2) scenario – concluding the regulation of the situation of the game including the record of outside influences;
3) rules –determining allowed and ordered behaviors of actors
4) simulator of reactions – reflecting effects of actions of actors in roles);
5) conjugations: *role – reaction simulator – role; scenario – role; scenario – reaction simulator; rules – role.*

A scenario is a basic component of the simulation game, essential for playing on account of its legibility, intelligibility and simplicity of language. Essential content of the scenario should include following elements:

[39] Pełech A., Balcerak A., *Pojęcia i definicje do nanomodelowania symulacyjnego*, Szkoła Symulacji Systemów Gospodarczych Antałówka'99, Wyższa Szkoła Przedsiębiorczości i Zarządzania, Politechnika Wrocławska, Warszawa 2000, p. 12-13.

– historical data, i.e. certain (selected) information concerning the past of the system reconstructed in the game;
– input conditions, i.e. description of objective system and its structure, as well as its state in the moment of initiation of the game.
– description of the game with special attention put on presentation of: aims, realized by parts of the objective system, planned tasks, potential methods of their realization, further stages of development of the situation.

Leopold postulates a different classification of elements of the "scenario of the game", he suggests following components[40]:

– the scope and the accuracy of briefing for participants of the games, including the description of the objective system, its model, descriptions of roles and rules of the game;
– schedule of the course of the game, with clear determination of the number of stages and duration of the whole game;
– rank of help given by the person administrating the game;
– rank of potential additional briefings;
– determining conditions of realization of the game combined with the necessity of e.g. isolation of participants, acceptable contacts between players;
– area of possible interferences of the manager of the game concerning changes in the model, of changes of rules, etc.;
– way of the reaction of the manager of the game to some situations not described in rules of the game.

Results generated by the simulation model of the game are dependent from decisions of one or many players. Therefore, assuming the criterion of division of the influence of decisions of players on results of the simulation model, it is possible to distinguish two types of simulation games[41]:

– games without cooperation, in which results achieved by one player are independent from decisions taken by other players;
– games with cooperation (with a common part), in which results achieved by one player depend from decisions taken by other players.

Simulation games with cooperation can be games[42]:

– of competition, in which better results of one player mean worse results of other players,
– of cooperation, in which it is possible to obtain better results for all players,
– of mixed rules, in those games it is possible to find elements of competition, as well as of cooperation.

In non-interactive games individual participants act in a certain autonomy; hence in interactive games there are areas (called *common parts* of the model),

[40] Ibid.
[41] www.ioz.pwr.wroc.pl/13.12.2009/pietron
[42] Ibid.

which are equally sensible to decisions of other players. In both cases decisions are not the only factor affecting changes of states of the model.

The literature of the subject presents another classification, in which the distinguishing factor is parameterization of games. Such classification is presented in the table 4.3.

Table 4.3. Charactristics of elements of structural games internally and externally parametrized

	Internally parameterized games	Externally parameterized games
Roles	determined stiff explicit simple	occurring along the game flexible ambiguous composite
Interactions	specified channels determined form explicit access to few channels predictable	channels built in the course of the game undefined form ambiguous access to many channels unpredictable
Rules	ordering stiff constant explicit established	forbidding flexible variable ambiguous arising along the course of the game
Objectives	imposed identical uniform brightly defined	occurring along the course of the game individualized multiple determined ambiguously
Criteria	predictable identical uniform enabling determining the winner brightly defined	unpredictable individualized multiple enabling determining the winner determined ambiguously

Personal elaboration

4.4. Serious simulation game

Abt[43] has distinguished a dichotonic division of simulation games into so-called *serious games* and *entertainment games*. While delivering to the participant satisfaction either from the result or from the very participation is a purpose of entertainment games, when games called serious have an utilitarian character.

> ***A serious simulation game*** *is a simulation game that serves to a cognition of the original being reconstructed in a model of to an achievement of certain skills of operating within this model*[44].

The aim of serious games is mainly the support of the process of learning and using the process of the game for changing the level of knowledge, education and skills. War games, political or management games are examples of serious simulation games.

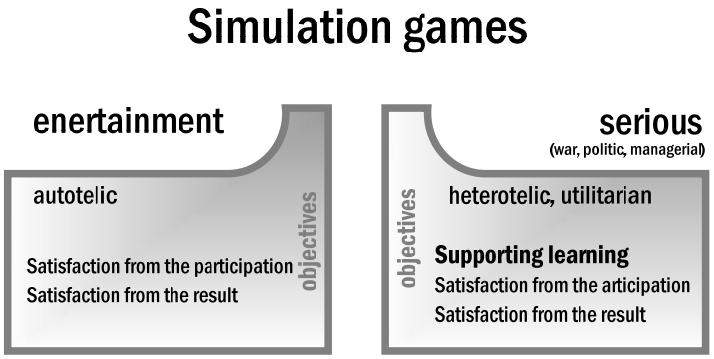

Figure 4.4. Purposes of simulation games: serious and entertainment games. Personal elaboration

Raising competence, developing the ability, finally knowledge acquisition, is also taking place in the process of entertainment games, which use the effect of „informal learning", unlike in intentional, planned and learning expected by de-

[43] Abt S., *Logistyka nowym wyzwaniem dla metod symulacyjnych [Logistics as new challenge for simulation methods]*, in: Symulacja Systemów Gospodarczych w Symulacja Systemów Gospodarczych, 1997, p. 7-15.

[44] Pełech A., Balcerak A., *Pojęcia i definicje do nanomodelowania symulacyjnego [Notions and definitions for simulation nanodesign]*, Szkoła Symulacji Systemów Gospodarczych Antałówka'99, Wyższa Szkoła Przedsiębiorczości i Zarządzania, Politechnika Wrocławska, Warszawa 2000, p. 29.

signers and managers of serious games. The figure 4.4. presents the division of games.

The specific structure of serious simulation games supports such intentional learning. It includes three stages: introduction to the game, simulation (the game itself) and conclusion of the game.

The process of learning that takes place in a simulation game can be described as a cycle, which key part is the *reflection* – a stage, in which *experience* brings a change (reinforcement or modification) of knowledge, skills and funds affecting the quality and method of *conceptualization* of particular problem. Such course is presented on the figure 4.5.

The understanding of a problem affects from the other side on the strategy and tactics of the active affecting the reality or the model, i.e. *experimenting,* which is the source of *experience.* This is why the conclusion of the game is being perceived as the most important stage of a simulation game – it is a stage closing the cycle of learning. This cycle repeats as well in every stage of the game[45].

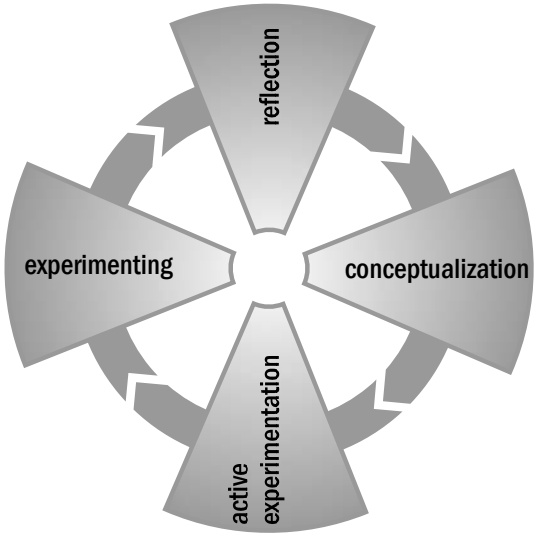

Figure 4.5. Cycle of the learning through experiencing. Personal elaboration

The second consequence of the unilitary character of serious games is the presence of a manager of the game (moderator or arbiter), who is surveying the course

[45] Bielecki W.T., *Efektywność symulacyjnych gier menedżerskich w porównaniu z innymi metodami kształcenia [Effectiveness of simulation in managerial games compared with other methods of education]*, Symulacje Systemów Gospodarczych, Antałówka 1997, p. 41-59.

and realization of internal goals of the game. The placement of the manager in the game is presented in the figure 4.6.

Independently from benefits it brings, a game is always a game. Limits between „*common life*", and a game or a play, are rather clear. In our everyday life we can observe clear borders related with the time and place of performer games. Children playing „*Star Trek*" or „*Hana Montana*" are parting with them going to the school whether getting back home from the friend. In the animal world of the game of hunting between young cats (predators), in spite of the great commitment, aren't ending with any serious injuries.

Borders between the serious simulation game and the reality are less sharp. The man is most often aware of a purpose, for which he is entering the world of the managerial, war or political game; he knows that entertainment isn't this purpose.

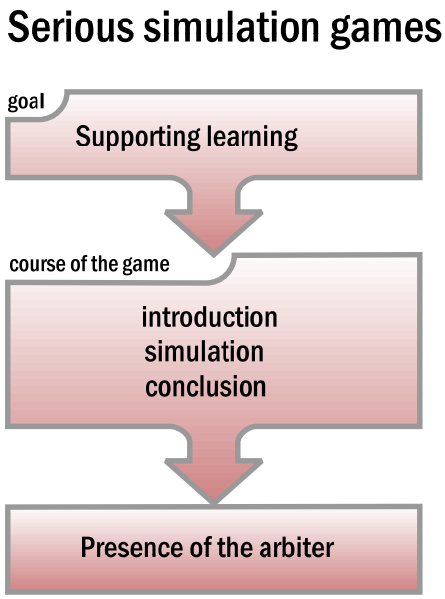

Figure 4.6. Specific features of *serious* simulation games. Personal elaboration

The game is often faithfully copying some real system and it is copying problems well-known from the reality. In the serious game, upon completion of the game, reflection is taking place; it allows drawing conclusions and enriching experience. In spite of utilitarian character of serious games it is worthwhile keeping features distinctive for all games. Thanks to them the effect of exploiting the old wisdom and seeking creative solutions will have the better effect. Therefore the

serious game should maintain a game. This is why Balcerak[46] has presented following postulates:

1) Lack of voluntariness in serious games could and should be compensated.

lack of spontanity in serious games is compensated by the acceptance of the game and the involvement in the game. The difference between a joyful game and a play is in the fact that rules being in validation in the game are external; initiating the game with commonly known rules obliges the following them.

> *The game is working as the **educating tool** because it is giving pleasure, rather than in spite of it. Separating pleasure from the process of learning has no sense, at least not in a real game*

2) In the evolution of man the play is preceding the game. Plays are accompanying us „from always", and they are even older than our kind; also other mammals and birds are playing.

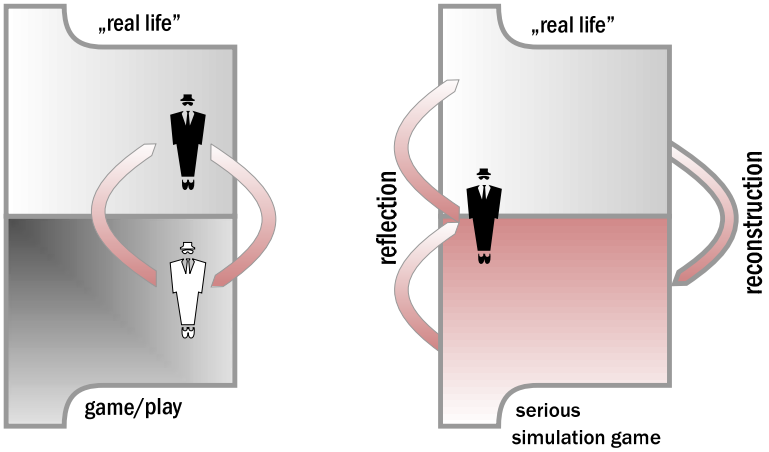

Figure 4.7. Limits between the game and „real life". Personal elaboration

Animals and the youngest children are playing games of the *paidia* type, with the majority of the *ilinx* element, 3-4 year old children pass to the stage of derivative play, next (3-6 years) dramatic, while in games of 5 year old children some

[46] Balcerak A., *Zorganizowana refleksja. Sens, forma i przebieg podsumowania rozgrywki gry symulacyjnej [Organised reflection. The meaning, the form and the course of recapitulating the games of a simulation game]*. Szkoła Symulacji Systemów Gospodarczych, Oficyna Wydawnicza Politechniki Wrocławskiej Wrocław 2005.

elements of *ludus* appear; children start to working rules out and voluntarily they are accommodating themselves to them[47].

3) Derivative games and strategic entertainment games (social games) are ancestors of serious simulation games. *Kriegsspiel* from the year 1811 elaborated by von Reisswitz is perceived as the first simulation professional game. From one side, serious simulation games occurred because since ages educative values of children's derivative plays were noticed. From the other side, the coming into existence and the road of development of the simulation through games is clearly affected by the universality and a popularity of board games with stiff rules and their meaning for practicing the strategic thinking. Irrespective of the social class, strategic board games became the form of not only entertainment but also sport.

4) Games and plays can occasionally have a serious application.

Similarly to the fact that along with achieving our maturity we don't loose our tendency and ability to play, the appearance of serious games didn't deprive entertainment game of their educational values. At present, just like in the past, there are cases of using seriously games that were designed for entertainment. At present it is possible to notice the rudiment of future multidisciplinary teaching and research methodology in simulation games, a tool which will enable the comprehensive, holistic form (*gestalt form*) of communication (e.g. like Secound Life). Man's participation in the world of play and game is illustrated in the figure 4.7.

It is possible to talk about main directions of using serious simulation games as[48]:

1. Tools of education and training, which motivates to the process of learning, is a stimulator of interest, shapes rules of selection of a particular strategy; forming attitudes.
2. Shaping intellectual and social skills.
3. Research tools (which mainly support examinations): examining of behaviors of systems, organizations, communities; study of behavior of people in organizations (e.g. innovation, tendency to the risk, tendency to cooperation, techniques of negotiation, dynamics of the team work), study of processed of making decisions, collecting data, opinions of respondents or experts, examinations of qualifications and competences.
4. A tool supporting communication and discussion; stimulation and support of strategic discussions, convincing for changes, liquidation of the „effect of reorganization", building organizational knowledge, revealing models of thoughts, providing metaphors; supporting the process of shaping collective opinions, initiating brainstorms.
5. Therapeutic and diagnostic instrument.

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[47] Ibid.

[48] Bielecki W.T., *Efektywność symulacyjnych gier menedżerskich w porównaniu z innymi metodami kształcenia[Effectiveness of simulation in managerial games compared with other methods of education]*, Symulacje Systemów Gospodarczych, Antałówka 1997, p. 41-59.

Areas of application of serious simulation games include among others: all levels of education, science and organization and management, administration army psychology, pedagogy, andragogy, economy, sociology, health, ecology, anthropology[49].

Serious simulation games often enable learning on basis of own mistakes with out damage for the original system. They use mechanisms activating, which is triggered by noticing the difference the planned goal and realized result. The defeat in a simulation game can be a cognitive, educational or scientific success, which can be almost as valuable as wining. Using games in education gives chances of transformation of the process of "*teaching*" into "*learning*". Situation occurring during games provide questions and problems to be answered. The will of understanding those issues motivates the process of widening the knowledge.

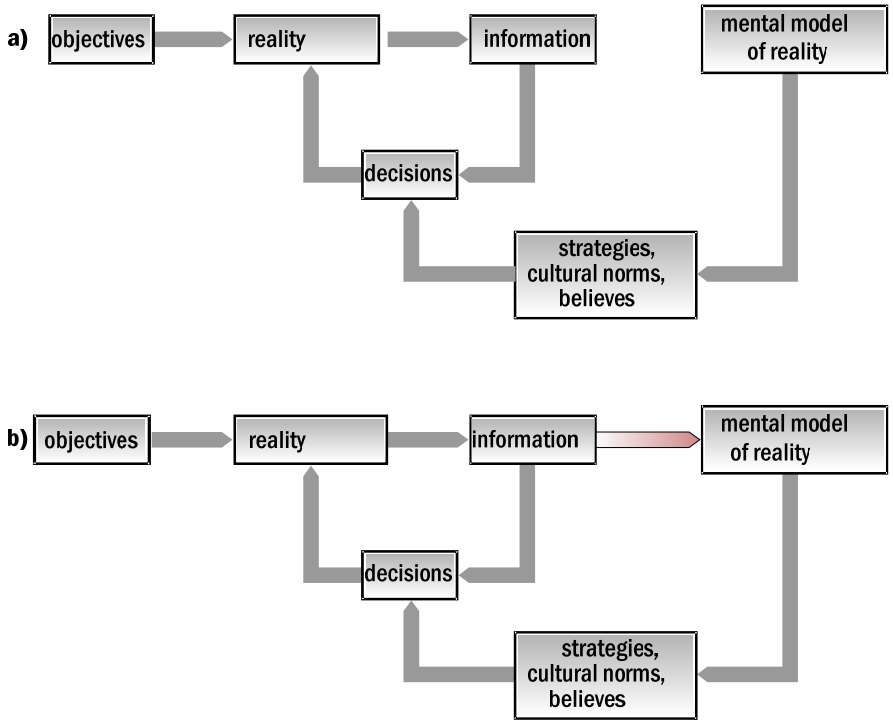

Figure 4.8. Learning – model of individual (a) and double (b) loop
Prepared on basis of: Balcerak 1998

Games enable the self-discovery for their participants: recognizing own resistance to stress, skills of taking action in conflictual situations, talents of a leader, negotiator, etc. They facilitate changing attitudes and eliminating prejudice. They

[49] Ibid.

are teaching the learning in the so-called double terminus. Games give a two way possibility of learning. First is based on basic associations of action – effects of the action. If decisions in the significant way is depending on norms, beliefs, prejudice, habits etc. it isn't guaranteeing enlarging the knowledge (see figure 4.8a). But when the information about effects of decision influences the change of the mental model, the second loop is becoming active (figure 4.8b), thanks to which a deep process of learning, i.e. of transformation of the experience into knowledge, takes place. Effects of the learning in the double terminus have a long-term meaning[50].

They enable integration and restructuration of the formerly acquainted knowledge.

Table 4.4. Attributes of a *serious* simulation game as a specific sort of game and simulation

Game	Simulation game	Serious simulation game
Voluntary and spontaneous or „joyful"; Included in rules; Fictional, distinguished from the everyday life; unproductive; Provides pleasure and satisfaction; contains elements of *agon* and *alea*, as well as *mimicry* and *ilinx*.	Dynamic models of a real or hypothetical system; its elements are: simulator of reactions, scenario with description of roles, rules and goals, actors play roles. Next states In the simulation depend on decisions of actors and decisions depend on information about the former state.	utilitarian; heterothallic; Supporting learning: change o level of knowledge and skills, change of attitudes, opinions and habits; Its' realization has a three stage: introduction, simulation, conclusion; requires management.

Prepared on basis of: Balcerak 2001

A *serious* simulation game is a trial of combining features of an autothellic element with an utilitarian tool (table 4.4); it is inheriting characteristics of a game and a play, it is a specific type of simulation model but simultaneously it is a method of research and/or education. This diversity influences the high potential of games as teaching and research tools.

[50] Balcerak A., *Patrząc w przyszłość gier kierowniczych [Looping at managerial games in the future]*, Symulacja Systemów Gospodarczych Antałówka'98, Wyd. Wyższa Szkoła Przedsiębiorczości i Zrządzania, Politechnika Wrocławska, Warszawa 1998, pp. 21-43.

4.5. Managerial games

4.5.1. The issue of managerial game

Managerial games are one of types of serious simulation games. They reflect the holistic system of operating of an economic organization – then they are called total managerial games; hence when they reconstruct particular aspects of actions of the organization – they are called functional games.

> ***Managerial game*** *is a simulation, in which people – participants, act as deciding persons in a simulated system.*
> ***Managerial game*** *is a simulation model including participants of the game that reflects competitiveness in a realistic way.*

Business, managerial games (because are being named differently in the literature) have their characteristics – which is slightly various from entertainment games. So, managerial games are[51]:

- Exercises designed for simulating essentials features of the organization and its environment;
- During the games participant of the game (businessman, manager, student or other decision-maker) is making decisions which are usually taking a few months or of years in a limited, short time;
- The model used in a game is reflecting internal features of described firm;
- The model is also reflecting the environment that can include the structure of the market, the state of the economy, clients, etc.
- The model also consists a set of decisions that may concern prices, advertisements, the production, employing and dismissing workers;
- The model also contains a set of input variables determined by decisions and the state of the environment. This set can include profit, share in the market, multiplicity of the sale.

Many practitioners of games have worked their characteristics out, which consisted in the range of serious simulation games. Loveluck[52] has introduced the term

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[51] Balcerak A., *Rodzaje gier menedżerskich. O rubieżach klasyfikacji [Types of managerial games. About frontiers of classification]*, Modelowanie symulacje systemów społecznych i gospodarczych, Prace Naukowe Instytutu Organizacji i Zarządzania Politechniki Wrocławskiej, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2007, p. 237-257.

[52] Balcerak A., *Rodzaje gier menedżerskich. O rubieżach klasyfikacji [Types of managerial games. About frontiers of classification]*, Modelowanie symulacje systemów społecznych i gospodarczych, Prace Naukowe Instytutu Organizacji i Zarządzania Politechniki Wrocławskiej, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2007, p. 237-257.

of total games into the characteristics of games. Total games are reflecting many aspects of the functioning of an economical organization.

> ***A managerial simulation game*** *is a simulation o fan objective system – an organization, where such states of the model depend on at least two elements sequence of decisions taken in accordance to established rules by participants of the game, who have determined managerial roles in the scenario of the game*.

> ***Managerial simulation game*** *is a certain structure, which is built from a model of an objective system, game's scenario, rules of the game and a system of roles prepared for participants of the game*.

Terms „*business game"* and „*management game"* are used not only in reference to simulation games, but also to other games or exercises, which are related by their subject with the functioning of enterprises or management of a company.

The Genesis of managerial games is related with the elaboration of the game called *Top Management Decision Simulation (AMA),* which was designed by American Management Association. The game obtained the notion of a simulation war game. IBM has created another game, which was functioning in the fifties of the 20th century – *Top Management Decision Simulation.* It was reflecting the competition on the market. Five teams participated in it taking quarterly marketing, production financial decisions – i.e. a set of decisions that included six issues; participants had a limited scope of decisions; they were able to select a value from 3 to 9 possibilities for each decisive variable. It was played until 10 years of functioning of the market reflected in the game.

In year 1957 there has been elaborated a manual managerial game[53] – *Business Management Game* (*McKinsey's Game)*. *Business Management Game* was reconstructing competitiveness of two or three firms acting on the common market. It had a similar scope of copying as *AMA*, yeti t was more comfortable to use because it didn't require any access to a computer. Moderators (two or three) or a superarbiter were working on elaboration of results of next steps of the simulation and on preparation of reports. Next games introduced to the managerial training were: *Top Management Decision Simulation* and *Decision-Making Laboratory,* as well as the *UCLA Executive Game.* The first game was very similar to the organization of

[53] Bielecki W.T., *Efektywność symulacyjnych gier menedżerskich w porównaniu z innymi metodami kształcenia [Effectiveness of simulation in managerial games compared with other methods of education]*, Symulacje Systemów Gospodarczych, Antałówka 1997, p. 41-59.

AMA game and it was reflecting a competition between several (in this case – three) producers, with included elements of a marketing activity. The game reconstructed four regions of firm's activity; three of them were "assigned" to each of competitors. So, each team taking part in the game had to use two different marketing strategies: one for the local market and the other for the common market. *Top Management Decision Simulation* simulated the financial aspect of the economic activity. It enabled, among others, taking loans in situations of risk for the financial fluency and there has been reconstructed the growth of costs of profits related with such action.

In first managerial games the profitability was the factor deciding about success. Further elements gaining importance and introducing into managerial games were: behavioral simulations including organizational behaviors, leadership and conflicts.

Despite their universalism, war games gained new competitors in form of "civil simulation games"[54]. Norman Angelli has built the *Money Game* in 1912. *Money Game* was an example of an entertainment game that was realizing educational objectives, In accordance to the rule „educate through the play". This group also includes the board game of Darrow, called *Monopoly*[55]. Since the thirties of the 20th century it is one of most popular social games. It has many characteristics of a managerial game, although it is being used mainly for entertainment.

4.5.2. Managerial games in managerial education

Managerial games (and other simulation games) in educational applications create a growth of interest in the subject being taught, they increase the motivation and activity of students, as well as the creativity. Examinations performed by Bielecki[56] and by Rzońca[57] have presented essential differences between: the absence in groups of students, in which there have been applied simulation games and the absence in groups learning in a traditional way.

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[54] Balcerak A., *Rodzaje gier menedżerskich. O rubieżach klasyfikacji [Types of managerial games. About frontiers of classification]*, Modelowanie symulacje systemów społecznych i gospodarczych, Prace Naukowe Instytutu Organizacji i Zarządzania Politechniki Wrocławskiej, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2007, p. 237-257.

[55] Ibid.

[56] Bielecki W.T., *Efektywność symulacyjnych gier menedżerskich w porównaniu z innymi metodami kształcenia [Effectiveness of simulation in managerial games compared with other methods of education]*, Symulacje Systemów Gospodarczych, Antałówka 1997, p. 41-59.

[57] Rzońca W., *Znaczenie gier kierowniczych w kształceniu przyszłych menedżerów [Significance of managerial games in the education of future managers]*, Symulacje systemów gospodarczych, Prace naukowe Instytutu Organizacji i Zarządzania Politechniki Wrocławskiej, Studia i Materiały, Wrocław 2003, p. 175-187.

Managerial games, similarly to other simulation games, engage emotions of participants of those games, thanks to what contents that games bring are being remembered in a better way and for a longer period of time. As instruments of education, they enable integrating the formerly obtained knowledge from various areas[58]. They can be also used during preliminary courses as an instrument for preparation to certain type of ordered absorbance of information. In Polish academic reality (in significant majority of universities), just like in lower levels of education, a system of education based on teaching in classes in form of lectures is being in validation[59]. Following systems are included in this type:

1. Traditional system, also called a *hebart's school* – it is characterized with the fact that its most important objective is the moral forming of strong characters[60]. It has a detailed division of content of the education program into subjects. Students are passive, they can't decide about the selection of issues that are being thought. A memory teaching is dominating, students are being encouraged to study only by external motivation, mainly by notes and frequent control of results of their learning process. The system also includes penalties (making up classes, penal studies, etc.)
2. System of new education[61], in other words a *progressive school* – it has introduced different view on the studying persons. The diversification of issues that are being thought were related with interdisciplinary blocks[62]. Students gain knowledge on their own, their activity is being evaluated; teachers are only observers of the process of education. Participants of this educational process have a certain influence on the choice of subjects of education. This system prefers teaching based on solving problems. The fundamental source of motivation is the internal motivation, especially the identification and revealing interests and needs, which should stimulate to research and study and - in consequence – to learning. This method doesn't apply frequent control of results – it is characterized with self-control. The basis of such approach is the assumption that the educating institution is the main but not only place, in which it is possible to gain knowledge.

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[58] Bielecki W.T., *Przedsiębiorczość w wirtualnym środowisku* Aspekt dydaktyczny *[Entrepreneurship in the virtual environment – didactic aspect]*. Wydawnictwa Naukowe Wydziału Zarządzania UW, Warszawa 1999.

[59] It is difficult to imagine a possibility of using synergy of experiences and knowledge of 30 students in the system of teaching in classes.

[60] Więcek-Janka E., Ciesielski A., *Symulacja w dydaktyce badań marketingowych*, Modelowanie symulacyjne systemów społecznych i gospodarczych [*Simulation in the didactics of market researches*, simulation modeling of social and economic systems], Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2008.

[61] Ibid.

[62] Dewey J.*, The Quest for Certainty.* A Study of the Relation of Knowledge and Action. (Gifford Lectures 1929). Capricorn Books, New York 1960, pp. 26-48.; in: dewey.pragmatism.org

3. *Contemporary* system, initiated by Freinet in 1976[63]. It is different from the traditional system, but also from the system of new education. Still, it doesn't exclude all assumptions and postulates determined by their authors. For example, it accepts the postulate of giving to students basis of a *systemized knowledge* or the progressive guideline to *activate young people* in the process of education. It is being assumend that students should absorb fundaments of a systemized knowledge, but also gain specific abilities on the road of independent cognitive actions[64]. The modern education underlines the purposefulness of a holistic teaching in primary and secondary levels of education, and the importance of subjective (specialist) education on higher levels. This system puts impact on the need of using different organizational forms of teaching, including also individual, collective and mass teaching. Modern didactics understands motivation as a system of aspirations of human activities that triggers and organizes human behavior and directs it to achievement of the objective. Types of motivation applied in the education are classified in accordance with needs of students and the specificity of subject[65]. Motivating people for development through education requires initiating a hubristic motivation in them[66], eventually – the internal motivation. Accomplishing teaching goals at narrow means and in the determined time is the university teacher's objective. *Teaching goals* should be interpreted as planned and long lasting educational assumptions concerning, how things should be thought, what values should be communicated and with what methods it can be obtained. Fundamental division of objectives of education can be referred to the reality and its universal understanding, as well as to the subjective evaluation of the learning person. The table 4.5 presents an example of such classification.

The realization of general and specialist goals in the modern requires an innovative approach of the teacher to problems he is presenting from one side, and using tools and methods enabling widening the field of perception of the student, concerning particular problem and using the synergy effect in thinking, collective synergy and creating and using hybrid tools – from the other side.

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[63] Więcek-Janka E., Ciesielski A., *Symulacja w dydaktyce badań marketingowych*, Modelowanie symulacyjne systemów społecznych i gospodarczych [*Simulation in the didactics of market researches*, simulation modeling of social and economic systems], Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2008.

[64] Kupisiewicz Cz., *Podstawy dydaktyki*, Państwowe Wydawnictwo Naukowe, Warszawa 1984,p. 39.

[65] Więcek-Janka E., *Zmiany i konflikty w organizacji*, Wydawnictwo Politechniki Poznańskiej, Poznań 2006.

[66] Nęcka E., *Psychologia twórczości*, Gdańskie Wydawnictwo Psychologiczne, Gdańsk 2002.

Table 4.5. Classification of purposes of formation

	Universal goals in the general education	Subjective objectives in specialistic education
Factual approach	gaining general fundamental knowledge from areas of mathematics, natural science, technical and social science; general preparation to the practical activity – participation in the process of transforming the nature and the social life; shaping the humanistic relation to humanistic values and attitudes and worldview beliefs connected with them.	Gaining professional knowledge from areas that are valuable for particular occupations; Preparation to manufacturing work Shaping attitudes and scientific beliefs, with special regard to areas of life, which are connected with the profession.
Subjective approach	General development of intellectual efficiency and cognitive abilities - including the thinking and creative talents; development of cultural needs, motivation and cognitive, social, aesthetic and technical interests; implementation of the self-education and the work on one self for the entire life.	Development of specialist talents that are important for particular occupation; Development of needs, motives and interests related with determined profession; Implementation to the constant improvement of qualifications through the process of self-education.

Prepared on basis of: Kupisiewicz 2005

There are many different versions of the process of education in modern educational systems. The choice between the canning and giving course of classes is affected by aims and content of the subject of teaching, as well as competences, preferences and habits of lecturers. It results by a preference of determined methods of educating, among which it is possible to distinguish the method of educational simulation games (simulation with use of games, i.e. *gaming simulation*). So, it is possible to establish two main groups of methods of teaching:

– verbal-memory methods (conventional),
– activating methods.

The traditional higher education prefers methods that give the role o fan expert and executor of knowledge to the teacher and which treats students as recipients of this knowledge. Such division of roles is perfectly known, even natural for people, who have passed earlier stages of education in schools, in which traditional methods of education are dominant (i.e. in majority of schools). Methods of activation require changing those roles and ways of communicating in the relation teacher –

students. The teacher should be a consultant and an organizer. Its objective is stimulating students to creative thinking, not only executing the knowledge communicated earlier. During the game and discussion concluding the game it is possible to face unpredictable situations, appear problems to which it isn't possible to prepare earlier, unexpected questions occur. From the other side – students that are used to a traditional way of teaching, present symptoms of resistance against the change, which is a proceeding to activating classes. For ones expectations of activity and co-responsibility can be depressing, others can perceive the change of forms and channels of communication as allowance to play without reflection and a less formal behavior[67].

Application of a simulation in a managerial training is justified with a possibility of forecasting the future in different horizons of time. Obtaining information about the designed system, its environment, dependencies, channels of information, is also a very important aspect[68]. The element of gathering data and its forecasting is also used in education of marketing research, in accordance to the accepted process of examination[69]. Forecasting is the last stage[70] in the analysis of data; it can have various forms and it can be realized with different methods. Intuitive, research and design methods are realized in frames of many subjects of the managerial training, especially in the interpretation of results (forecasting) of marketing research. Hence, recursive methods are, unfortunately, rarely used in didactics of marketing research[71].

In author's opinion, the basic problem is the term of simulation itself; it can be interpreter in various ways. The table 4.6 presents selected concepts of simulation, in accordance to the content of fourth charter of his book.

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[67] Bielecki W.T., *Efektywność symulacyjnych gier menedżerskich w porównaniu z innymi metodami kształcenia [Effectiveness of simulation in managerial games compared with other methods of education]*, Symulacje Systemów Gospodarczych, Antałówka 1997, p. 41-59.

[68] Balcerak A., *Symulacja we wspomaganiu i badaniu uczenia się organizacyjnego [Simulation in the suport and research concerning the organized learning]*, Modelowanie symulacyjne systemów społecznych i gospodarczych, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2006, p. 161-181.

[69] Kaczmarczyk St*., Badania marketingowe. Metody i techniki [Market researches. Methods and techniques]*, Państwowe Wydawnictwo Ekonomiczne, Warszawa 1995.

[70] Hence, it is not always realized by scientists.

[71] The opinion expressed on basis of observations of courses of classes in universities in Poznań and personal interviews with lecturers teaching about marketing research.

Table 4.6. Review of particular concepts of simulations

Authors of concepts	Contents of the notion simulation/simulation model
G.B. Evans, G.Wallace, G.L. Sutherland (1973)	Simulation uses the model in order to create a chronological history of states of the model, which is treated as a history of states of the system put into the model
G. Gordon (1974)	The system simulation can be defined as a technique of solving problems through observation of behaviors within the dynamic model of the system
J.P.C. Kleijnen (1974)	In its narrow meaning, the simulation is defined as experimenting in time on an (experimental) model. Such experimenting includes taking samples of values of stochastic variables obtained from probability distributions of those variables. Therefore, such simulation is called stochastic
B.P. Ziegler (1984)	Creating a model or simulation means that a set of actions related with building models of real systems and their simulations in computer reality
J. Gościński (1977)	A simulation is an act of representation of certain aspects of the real world with use of numbers or symbols, which can be freely manipulated for facilitating the examination of this phenomenon. Simulation means creation and use of models in order to support the evaluation of the concept and the study of dynamic systems or phenomena

Personal elaboration

Presented definitions illustrate that they all contain three main elements – real system, model and computer. Modeling concerns mostly the dependency between real systems and models; however the simulation is mainly related with dependencies between computers and models. The program of education of marketing research takes under consideration the use of methods of forecasting in the analysis and interpretation of conclusions[72]. The simulation is a method enabling using information obtained in the research process with regard to following aspects:

– Prognostic – it determines qualitative and / or quantitative characteristics of functioning of the examined system for particular conditions[73].
– Identification – it creates qualitative and / or quantitative descriptions of rules of functioning of the examined system[74].

[72] Basing on knowledge from the area of modeling and simulation, which have been realized in earlier semesters.

[73] Known: entry, function of transformation. Unknown: exit.

[74] Known: entry, exit. Unknown: function of transformation.

– Rationalization – it determines conditions of functioning of the examined system, where qualitative and /or quantitative characteristics of the system have to fulfill particular criteria of rationality (e.g. optimization)[75].

In terms of realization of the purpose[76], authors have chosen the term of simulation interpreted as:

– Creating and using models for the support of evaluation of the concept and research on dynamic systems and phenomena.
– Act of representation of some aspects of the real Word with use of numbers or symbols that can be manipulated without limits for better achievement of individual examination.

Those terms explain the need of using simulations through realization of universal and specialist goals in the education of marketing research[77]. The sense of simulation research is the rise the knowledge about the system and, depending from the aim of building and using the model, determined knowledge can be reduced only to information about the nearest future of observed input data (what will happen, if…?) and in some cases – it can even result with revealing unexpected dependencies and rules – this is the second extreme on the scale of advantages of simulation.

Benefits resulting from the use of simulation models (generally speaking: the growth of knowledge about modeled system or class of systems) require knowledge on the stage of constructing a model. This knowledge must concern the system, its environment, flows of energy, matter and information between the reflected system and the environment, as well as skills of reconstructing those dependencies in a way that would be adequate for the process of creating a model.

Running a game requires much time and work. Despite many years of tradition of using methods of simulation games in education can be treated in some circles as an innovation. Therefore, even practitioners, who are convinced about its efficiency, must face the resistance of the environment against the method.

The impossibility of applying games in didactics is often associated with mistakes of the project or the realization of the game. Those are the most popular ones[78]:

– Restriction of use of the game for the simulation. Avoidance of the introduction or of the conclusion;
– Treating games as self-sufficient teaching tool, even though they are designer for supporting other forms of acquiring knowledge (literature, lectures, discussions concerning particular cases);

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[75] Known: exit, function of transformation. Unknown: entry.

[76] Justifying using recursive methods, especially simulations of interpretations of results.

[77] Gościński J., *Zarządzanie praktyczne [Management in practice]*, Zarządzanie, 1987, nr 8, p. 50-51.

[78] Balcerak A., *Symulacja we wspomaganiu i badaniu uczenia się organizacyjnego*, Modelowanie symulacyjne systemów społecznych i gospodarczych, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2006, p. 161-181.

- Incorrect reconstruction of the incertitude of decisive situations, especially overestimating the importance of the random factor in short-term decisions. It is one of main factors of risk in the phenomenon called *video game syndrome*. The major manifestation is that: the player uses the game for entertainment, he „passes" the game and his goal is to win or to improve his result. He realizes his objective without upgrading his knowledge about the subjective system;
- Superficial copying the environment of the system and relations between endo- and exogenous variables;
- The form is hiding the content. in computer games the dynamic graphical interface of the user and the use of multimedia communications can facilitate the receipt of the information and to streamline the decisive process. However, it sometimes happens that the excess of striking computer solutions causes the noise effectively drowning the being of the game out ;
- Excess of complexity of the model and procedural rules. Disturbed proportions between the time dedicated to the process of learning rules of the game and the time dedicated for learning through the game;
- Too fast games – they are often caused by maladjustment of the tool to available assets (time, space, computer equipment);
- Simulation of reaction for decisions made by players in a way that is punishing their features of personality;
- Errors of arbitration: discrimination, interfering in decision-making processes of participants ;
- Directive attitude of the arbiter running the games and managing the conclusion; repressing emotions of participants, stripping the game off elements of play.

Thematic questions for the chapter 4

1. Define the notion of games
2. Discuss the difference between the play and the game
3. Discuss the ancient history of games
4. Discuss the modern history of games
5. Discuss essentials characteristics of games
6. Characterize types of games, taking into account the dominating element – according to the theory of Cailloise
7. Define the idea of a simulation game
8. Define the term of decisive game
9. Discuss the course of a simulation game

10. Discuss differences between games externally and internally parameterized
11. Make the classification of simulation games
12. What concerns the difference between the play and the serious simulation game
13. Enumerate and discuss characteristics of a game, simulation game and a serious simulation game
14. Discuss the term of a managerial game
15. Discuss difference between a managerial game and an entertainment
16. Characterize differences between total and functional games
17. Enumerate some of first managerial games
18. Discuss the placement of didactic games in educational systems
19. Characterize methods of educating
20. Enumerate errors in application of games in the managerial education

Chapter 5
Psychology in simulation games

5.1. Introduction

The participation in simulation games is reflecting behaviors of players in real world. During the game appear the same emotions that we meet in everyday life (joy, sadness, annoy, envy). It is also easier to identify defense mechanisms applied by the individual, as well as motivators, which are affecting the participant of the game. How in that case should one look at simulation games from a point of view of psychology? Should it be treated as an element of education and teaching? Maybe it should be understood as a compensation of everyday life? Or maybe as an alternative and escape from problems?

The simulation game is a dynamic model, in which people playing roles chosen or assigned to them, described with script, are elements. During every stage of the games decisions which influence the other parts of the model (including other players) are being taken. Each decision requires verification and control of its results and that becomes the basis of making further decision[1]. The sequence of taken decisions leads to a certain consequence, which is most often a reward or a penalty. However a full acceptance of the role and identification with the figure introduced in the game are another condition of the interesting games besides factors determined above (as claim young people).

In 2004 Więcek-Janka conducted research at secondary schools: secondary school and musical in one of cities of the Greater Poland. They have been examined 30 children in every of schools. Identifying the situation of the involvement in simulation games amongst young people was an aim of the research[2]. The researcher asked among others questions concerning the issue of the game, the simulation and conditions a game must fulfill so that it became popular. Examination (mainly of quality variables) showed that the simulation game was waylaying on the three fundamental assumptions: it must be realistic for the participant, it must give the chance of winning and it must create involvement – „*absorb*". It also turned out that the pupil of the secondary school was participating in games of

[1] Pełech A., Balcerak A., *Pojęcia i definicje do nanomodelowania symulacyjnego [Notions and definitions to simulation in nanodesigning]*, Szkoła Symulacji Systemów Gospodarczych Antałówka'99, Wyższa Szkoła Przedsiębiorczości i Zarządzania, Politechnika Wrocławska, Warszawa 2000, p. 12-13.

[2] Więcek-Janka E., *Psychologia gier symulacyjnych [Psychology of simulation games]*, Prace Naukowe Instytutu Organizacji i Zarządzania Politechniki Wrocławskiej, Seria: Studia i Materiały, Wrocław 2004.

different type on average 9 hours during the week, however a student from music school – 3 hours. Such big difference between respondents is pointing at all different sets of motivators, but a leisure time they had at their disposal is playing the major role. Young people from profiled schools have a wider program of teaching is so absorbed by study that the same awareness of „existence" f leisure time, and the same the possibility of bigger engagement in the game, becomes dubious. In addition, profiled schools (plastic arts, music, sport schools) are organizing the sequence of additional classes which are ending with the verification for their pupils (award or penalty). One should add that such evaluations are being taken out not only by teachers, but also by peers – in this case only verbally. Determined classes also have additional important functions: they allow identifying needs, realizing dreams, identifying with the real (or more seldom – imaginary) hero. So, a student wants to be a great musician, like Chopin, painter like Picasso, professional sport player, like…[3].

As it resulted from the examination, pupils from non-profiled schools are able to determine their needs but they have limited possibilities of verifying themselves in the environment their peers in their area of interest. They can't realize their dreams, so they play simulation games more often (often with fictional story) because they are easily available for them. They often change those games, in their perception they aspire to perfection and they gain the higher stages of initiation. They identify themselves with the hero more quickly. Gaining such abilities upgrades their self-esteem and allows to risk entering into the game, for example online and finding themselves in a group under the any figure of chosen hero.

5.2. Psychological needs but simulation games

Human needs lie at sources of motivation of action. Each player entering into the game evaluates his chances that the effort he will put into the match will be sufficient for realization of the objective determined in the game. When the probability of the accomplishment of the purpose rises, also a probability of taking action grows. It is possible to recognize this relation as the condition and to categorize it as preliminary establishments. It is also important to evaluate the degree of fulfillment of needs in result of taken actions; in other words asking: will the effort bring profits? Admittedly it is a subjective assumption, but in accordance with the principle of the economics of effort[4]. If the preliminary estimation will show that the effect will be disproportionately small – motivation for initiating or continuing of the game will run short.

[3] Ibid.

[4] Czerniawska B., Motywacyjne problemy zarządzania [Problems of motivation in management], Państwowe Wydawnictwo Naukowe, Warszawa, 1980, p. 42.

Studies of the literature of the subject present that there is a strong relation between the identification of needs and the motivation to realize the task. Opinions of psychologists concerning this subject can be presented rather widely: starting from the conviction that there exists an internal creative motive, to the opinion that the participation in games requires particularly strong motivation.

Psychologists often use the expression "drive", when they assume that the source of motivation has biological character. Expressions: motive and need, are used most often for determining psychological and social motivation that has been acquired or learned. So, motivation is characterized by[5]:

- arousing the energy,
- directing effort to the defined objective,
- selective turning the attention to essential stimuli,
- creating the integrated standard of the reaction,
- persistent continuing the activity for them this way, until conditions that shaped the method will change[6].

Considering characteristics of motivation there have been distinguished three types of motivation: external, spontaneous and hubristic. In educational and training games mostly the external type of motivation is being applied, in consists most often from awards i.e. evaluations, praise and material prizes and penalties, i.e. lowering evaluations, oral reprimands. Amabile[7] and Łukasik[8] point at the harmful role of external motivation (positive and negative) in the game. Authors have observed a certain dependency during classes of the subject „Marketing games". Teams that cared most about winning, i.e. gaining the price, which was the note „very good"; presented poor final results. In the Amabile examination similar observations were made – the expectation of external evaluation lower the quality of realization of the task. However Maltzman[9], quoted by Nęcka, presents data from experiments, in which there have been obtained a growth of quality of realized tasks thanks to implementation of instructions. It conduced to a conclusion that the award can have a positive effect in case of games with brightly determined and stiff instruction, however games requiring creative thinking and searching new solutions necessitate also additionally intrinsic motivation. But it isn't nothing else like deriving satisfaction from the awards included in very the activity – game itself.

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[5] Zimbardo Ph., Ruch F., L., *Psychologia i życie [Psychology and life]*, Wydawnictwo Naukowe PWN, Warszawa 1994.

[6] Ibid.

[7] Amabile T.M., *Creativity in context*, Westview Press, Boudler, 1996.

[8] Łukasik A., *Zewnętrzna ograniczenia procesu twórczego [External limitations of creative process]*. Wydawnictwo WSP, Rzeszów 1999.

[9] Nęcka E., *Psychologia twórczości [Psychology of creativity]*, Gdańskie Wydawnictwo Psychologiczne, Gdańsk 2002.

Csiksztenmihalyi[10] dealt with examining reasons, for which people perform useless activities (for example some games, unfortunately); he introduced the term of "wave", also called an autotelic experience. it is a state of experiencing positive emotions, such as interest, joy and excitement. It is manifesting itself with fluid and competent performance of complicated activities without manifestations of boredom, tiredness or discouragement. A balance between the level of competence and the level of requirements or difficulty of tasks are a condition of liberating such a state.

Realization of needs of the higher class, like needs of achievements or self-realization, is strongly associated with hubristic motivation. Kozielecki[11] interpreter the hubristic motivation as aiming to exceed own achievements on determined area and persistent aiming to confirm and enlarge own value.

The behavior motivated by a hubristic need can have two forms. First, it can become a rivalry with other people or for confirming himself of own excellence. In the second form the hubristic need can lead man to a pursuit of excellence. A person motivated by a hubristic need can often creatively solve problems included in a simulation game. According to the concept of Sternberg and Lubert[12] such individual should have determined personal assets necessary to initiate some creative actions at his disposal. The list of individual assets necessary for taking creative action is presented in the table 5.1.

Table 5.1. Individual assets necessary to take creative actions

Type of assets	Conditions for making creative decisions
Intellect	developed ability to make synthesis sufficiently developed abilities concerning: analyzing practical skills
Knowledge	sufficient in determined area not so vast enriched with elements from other domains
Style of thinking	legislative monarchial
Personality	Willingness of taking risk tolerance for ambiguous information desire for overcoming obstacles
Motivation	hubristic motivation, intrinsic ambition, aspiration to the development and achievements
Social environment	appreciating results of taken action presence of slight barriers

Prepared on basis of Sternberg and Lubert, 1995, p. 118 and Nęcka, 2002, p. 179

[10] Csiksztenmihalyi M., Cretivity [in:] *Flow and the psychology of discovery and invention*, Harper Colins Publ., New York. 1996.

[11] Kozielecki J., *Transgresja i kultura [Transgression and culture]*, Wydawnictwo akademickie Żak , Warszawa 1997.

[12] Sternberg R. J., Lubart T. I., *Defying the crowd* [in:] *Cultivating creativity in a culture of conformity*, Free Press, New York 1995.

In the literature on the subject two approaches to the classification of psychological needs are most popular: Maslow's and Herzberg's. Wanting to identify the Reed, which is an involvement in simulation games, we should discuss theories mentioned above.

Maslow distinguishes five levels of need, which can be combined into two groups. Maslow's elementary needs (see figure 5.1) respond to hygienic needs of Herzberg and they include physiological and security needs. Needs of higher level at Maslow's hierarchy refer to motivating factors of Herzberg, i.e. social needs, need of respect for himself and need of self-actualization.

Thinking about feelings of satisfaction and dissatisfaction resulting from the realization of needs classifications of factors influencing sensations of players has been made. The table 5.2 presents it.

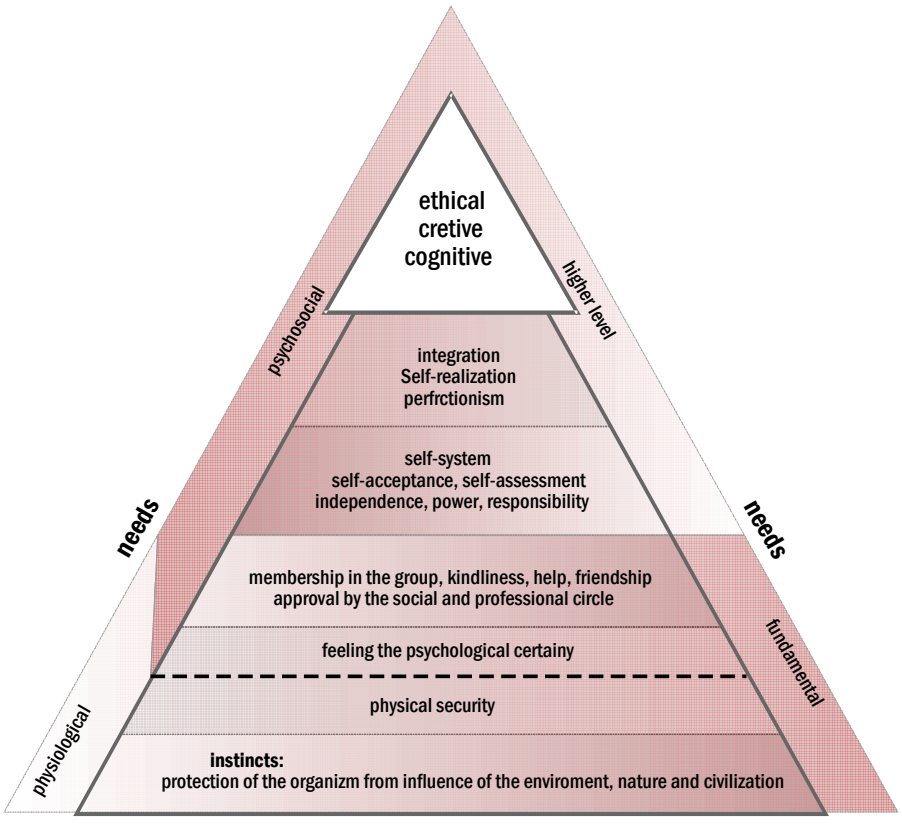

Figure 5.1. Maslow's hierarchy of needs. Personal elaboration

Table 5.2. Factors affecting feelings of satisfaction and dissatisfaction

Factors leading to	
extreme dissatisfaction	**extreme satisfaction**
Game policy Control Relations with the moderator Work conditions Expected reward Relations with collegues Private life Position in the group	Achievements Appreciacion of the moderator The game itself Responsability Promotion in the group Personal development

Personal elaboration

Taking under consideration groups of needs presented in the hierarchy of needs of Maslow, authors of present elaboration have characterized and classified players as follows:

The first group of players is composed from persons that realize their elementary needs with help of video game "*console*". These needs concern mainly improving conditions of work on the computer, increasing own property of e.g. new, current games. For these persons the game is a form „of cleaning" and escapes from failures, of finding safety in a world created by oneself. These are most often not very inventive, not very creative, often immature persons. They usually play into known (worked out) games, in which the result is supposed to raise their self-assessment.

The second group of players is realizing needs of higher class based on incentive factors. In this group it is possible to distinguish player, who's overriding objectives to seek new friends, new acquaintances, of harmonious interpersonal relationships; their actions are conducted by the need of *membership*.

The next group of players are those who search for tasks (outsider the environment of their closest ones), in which it is possible to demonstrate competence and skills; those persons realize their need *social status*. Constructiveness, ingeniousness, creativity, self-analysis and commitment are features characterizing those persons.

The last group are experimentators, who seek in games the risk and innovation; those are persons that aspire to the *self-realization*.

McClleland[13] has presented another interesting approach to the classification of needs in his model of motivation. He has distinguished three basic groups of needs:

[13] Sajkiewicz A., (ed.) *Zasoby ludzkie w firmie [Company's human resources]*, Poltext, Warszawa 2000, p. 204.

- achievement,
- power,
- and affiliation.

According to McClleland's model it is possible to present diversified characteristics of players, who are motivated by various needs and different motivation.

Players being guided by a need of achievements; are competing with the standard imposed on themselves, they are raising the quality of taken action, they are seeking unique achievements, they are setting objectives with the low or average level of risk. Such persons require the fast feedback. Players motivated by the need of power in the game and powers are choosing games on-line, which are awarding „iron fist" and fast decision making. A possibility of arousing at other strong emotions and exceeding other with effectiveness is important for them. They are interested above all in the reputation, the position and the status. Players carrying the need of the affiliation out are entering into the game in order to be liked. They want to be accepted and to have friends. The game is supposed to provide them creating new relationships with interesting people. Więcek-Janka[14] offered another form of classification of players, in reference to needs they realize. An easiness of entering and leaving the game are a main criterion of identity. Then it is possible to distinguish following classes:

- „*Easy in – easy out*". Single game (player – PC). Such game allows raising one's self-esteem, using mechanisms of rationalization of the process of becoming aware of weakness, realizing needs of achievement, of success, it enables training in taking risky decisions without suffering direct consequences.
- „*Difficult in – easy out*". Team game online. It lets carry the need of the social status and in it of rivalry out. In such case appears the expectation of award for the realization of the put purpose. Additionally the player is exercising intrinsic motivation, he has the possibility of creating „of group unity", of expressing emotions and making decisions within the group. „*Difficult in – difficult out*". Commercial managerial games allow for building the group membership, bearing responsibility for group members. They shape mechanisms of selecting the leader of the group. They enable drawing internal rules of functioning in the group up as well as establishing a system of penalties and awards, including their execution. They fulfill the need of taking challenge. They are ruled by the hubristic motivation.

[14] Więcek-Janka E., *Psychologia gier symulacyjnych [Psychology of simulation games]*, Prace Naukowe Instytutu Organizacji i Zarządzania Politechniki Wrocławskiej, Seria: Studia i Materiały, Wrocław 2004.

5.3. Classic theories of psychology but simulation games

Psychological conceptions are providing the general notional framework, enabling the description of the phenomenon that interests us. However they are interpreting the simulation game unusually widely and therefore none of concepts presented above hasn't been verified in any examinations. It doesn't mean that such deliberation is unnecessary. They would enable asking detailed questions and searching answers.

Gestalt is one of newest psychological theories. As philosophy of life, it is arising from one side from psychoanalysis, on the other from the existentialism, the phenomenology and the Buddhism Zen. *Gestalt* isn't actually neither full philosophical direction, nor fully "scientific" cannon of psychology. It is something combining the psychology, philosophy and art. However many conceptions worked out by Gestalt entered the dictionary of contemporary psychology.

In the classic approach of Gestalt psychology, the simulation game has the task of aspiring to *„change the structure of the problem situation*"[15]. The term *Gestalt* is crucial in described theory – it concerns close terms of the system. Presented form is characterized by the fact that it can't be brought to parts shaping it. Overcoming obstacles and solving the problem included in the game will resemble supplementing an unfinished picture. It is possible to realize by examining the problem from different „prospects" and treating it as a whole. Strategic and managerial games often bring the effect of productive thinking in, which is interpreted as a process bringing new effects (for example new understanding of the problem, new knowledge). An effect of the access is an equally essential element of *Gestalt* psychology used in simulation games. It is a sudden moderation of the perception of the problem. It is the central moment of each match, it is a moment, in which the new idea, new strategy occurs. Next essential notion is „attentiveness". It is possible to define it as the ability of direct feeling reality. It concerns both outside reality and inner emotional states. According to Gestalt supporters, the European culture and breeding are not teaching people of this ability. People in European (and not only) culture are looking at world through the prism of mental structures instilled in the childhood which are isolating them from natural feeling themselves and their surroundings. Therefore Gestalt therapy above all is just set for reteaching people attentiveness. Attentiveness requires courage because its essential component is self-awareness, i.e. ability to perceive his own as he is for real, with all defects and advantages, with the story of the emotional life and objective self-assessment. The attentiveness requires also acceptance – both of oneself, with the own mortality and all deficiencies, as well as environment – with all of its positive and negative emotional charge. Simulation games can be used in *Gestalt* therapy as elements of the training of attentiveness.

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[15] Nęcka E., *Psychologia twórczości [Psychology of creativity]*, Gdańskie Wydawnictwo Psychologiczne, Gdańsk 2002.

It is also worth wide to take under consideration the classical version of *Psychoanalysis* created directly by Freud; it can be characterized according to following points[16]:

Natural human instincts, especially a sex drive, are in aggressive conflict with moral and social norms imposed by the society. Freud has named this set of norms and generally whole of human culture as „*superego*". It can be also compared to the conscience or a system of values of the individual. Above norms are suppressing recalled instincts. It is held through a few psychological mechanisms so as denying, sublimation and denial, which are pushing back thoughts and emotions generated by drives to the area of the mind which Freud named „id" – that is to the subconsciousness. Id is acting in the irrational way – impulses are demanding the satisfaction –irrespectively of whether it is socially accepted. No matter how unaware, these emotions still are milling in the subconsciousness, strongly influencing consciously felt thoughts and emotions which Freud named „*ego*". The ego is representing the view of reality physical and social had by the individual, knowledge about, what is leading to what and how to be in the perceived world. Part of the function ego consists on choosing actions, which are satisfying impulses of the id not involving undesirable consequences. In fact, contents included in „id" are the real driving force of all action of people, whereas „ego" is only a type of the mask or the amour needed for the smooth functioning in the society. Almost always this mechanism of covering impure thoughts and generated emotions by instincts isn't functioning perfectly and cracks appear on the amour. These are e.g. wrong activities; intentional forgetting about important cases and dreams.

The „*Freud's egg*" illustrates this classical approach to the theory of psychoanalysis. It has been presented on the figure 5.2.

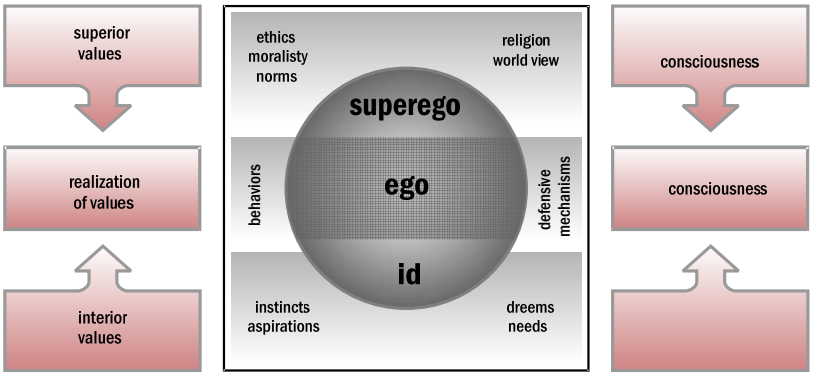

Figure 5.2. „Freud's egg". Classical approach to the personality in psychoanalysis. Personal elaboration

[16] Freud Z., *Poza zasadą przyjemności [Apart from the pleasure principle]*, Państwowa Izba Wydawnicza, Warszawa, 1973.

The simulation game proposed by Więcek-Janka[17] allows to turn the „Freud's egg" away and pushing off moral, ethical and social norms (superego) to the further plan. The superior place in virtual world of the game can fill the id with staying unaware until so far one's drives, dreams and aspirations. The figure 6.3. illustrates such case.

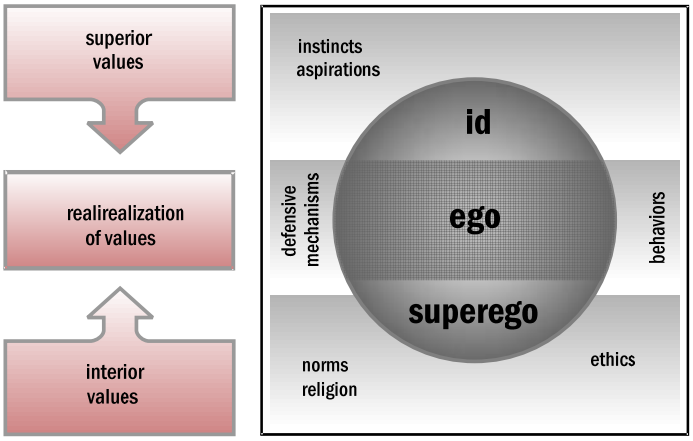

Figure 5.3. Turning components of personalities away in simulation games. Personal elaboration

Psychodynamic concepts of psychology refer to the non-awareness and preconsciousness. In this approach involvement in the simulation game, as most conscious, is using two subconscious thought processes: primitive and secondary. The primitive process is impulsive, maverick and subordinated to the pleasure principle and it corresponds to understanding the idea of play (see chapter 4). However the secondary process was determined as logical, stereotyped and subordinated to the principle of the realism[18], what refers to the idea of stiff games. This division corresponds to the ranking of players on account of needs that are realized, presented above.

Patrick and Wallas in their theory of incubation developed the idea of unaware work on solving the problem. The classical model of four stages of the process of thinking is referring the repeatable sequence of action in simulation games[19]:

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[17] Więcek-Janka E., *Psychologia gier symulacyjnych [Psychology of simulation games]*, Prace Naukowe Instytutu Organizacji i Zarządzania Politechniki Wrocławskiej, Seria: Studia i Materiały, Wrocław 2004.

[18] Ibid.

[19] Więcek-Janka E., *Zmiany i konflikty w organizacji [Changes and conflicts in the organization]*, Wydawnictwo Politechniki Poznańskiej, Poznań 2006.

1. Preparation – preparation, data collection, defining problems included in the group of preliminary activities;
2. Incubation – spontaneous, unaware generating ideas, during which the awareness of the player is performing activities that are not related with the problem of activity;
3. Illumination – sudden understanding the nature of the problem and noticing the solution;
4 Verification – inspection whether the incubated idea is meeting expected criteria.

Freud had his successors in persons of Carl G. Jung and Alfred Adler, who expanded the psychoanalysis with the term of the *instinct of death*[20]. According to them, the second after the sexual drive, force creating the subconsciousness, is the fear of death and. The compulsion to deal with feeling the rejection and the inevitability of death can lead to „escaping" into virtual world of games. In this world the player can accustom himself to the death in games of „beat – kill" type; and what's more in it – he can „rise from dead" and continue the game.

5.4. Emotions in managerial games

Everything is pointing at the fact that emotions not only influence the course of the simulation games, but they constitute its essential component parts They realize the motivating function of the game (they "drag into the game"), they are stimulating, but also they have a cognitive function that consists in monitoring the course of the game. Simulation games consist in the study and the implementation of strategies of achieving a defined objective in a limited time. Since a rest is often missing, games must be permeated with intense emotional states. The spectrum of emotion is wide: from depression in moments of the crisis, to euphoria in moments of success. Between them anxiety, twitchiness, anger, aggression but also relaxation, peace and satisfaction appear. Time is needed in order to experience these all emotions in the everyday life. However the game allows feeling them in the sequence of one hour.

Kocowski[21] introduced the term of phylo creative thoughts, i.e. thoughts that contribute to the creative thinking and searching for original solutions. In the set of those emotions he included among others interest, joy, interpersonal sympathy. Heinzen[22] distinguished two types of actions used pro-actively and reactively in games. First they have aspiration character and they consist in using noticed possibilities and they are being directed with internal factors and steered with positive

[20] Zimbardo Ph., Ruch F., L., *Psychologia i życie [Psychology and life]*, Wydawnictwo Naukowe PWN, Warszawa 1994.
[21] Ibid.
[22] Ibid.

emotions. Actions of the second kind have evasive character and they are being motivated with extrinsic factors (penalties and awards).They are being steered with negative emotions, mainly with fear. The fact that participation in a game is emotionally expensive is undisputable. We pay, mostly with fear from being evaluated and from failure, but also with fear from responsibility and rejection. The necessity of taking risk is also an emotional cost of participation in the game that we should take under consideration. So, if someone doesn't like risk or can't tolerate it, he can participate in matches strictly on a reactive basis. Probably, accustoming to the risk has developmental effects, while fear from risk is stopping the player from searching for original solutions.

Some emotions help, other hamper conducting the game in a planned way. Some of them are facilitating us inventing and accepting new ideas, other lead to a critical evaluation and facilitate rejection of worse ideas.

5.5. Defensive mechanisms in simulation games

The goal of a simulation game is to provide to a player experience related with solving decisive problems occurring in the reality in a short period of time. If during games emotions appear, various forms of motivation, also defense mechanisms of the personality must appear. They allow assuaging the fear resulting from internal conflicts. In everyday life those mechanisms function more or less consciously. Along the whole life we develop and improve the whole set of defensive mechanisms that we use in particularly difficult situations. Solving problems, making decisions, bearing responsibility, experiencing impasse, states of sadness and joys are integral parts of every game. Without using methods of defense few players would hang on until the end of the game. There are many mechanisms that can protect the „I" from requirements imposed by instincts and, in result, reducing the tension. Hence; they all have different adaptive value. Psychologists distinguished a whole range of techniques of defensive mechanisms:

- *Avoiding acting*, which includes relegation, exaggerated self-control, suppressing, and postponing.
- *Displacements* with: fixation, inversion, compensation, conversion, regression, sublimation, substitution and transference.
- *Distortions of reality*, which include the devaluation, dissociation, fantasizing, unjustified generalization, idealization and intellectualization.
- *Accepting another person's behaviors*, which include identification, introjections, conformism and internalization.

It is worthwhile presenting more precisely mechanisms of: suppressing, sublimation, rationalization, fantasizing, projection and compensation.

Suppressing (relegation) is aimed on subduing and minimizing tendencies assumed as harmful, e.g. aggression and suppresses it to the subconsciousness. Suppression is a mechanism rarely used in single simulation games, even if from this

reason that at least a part of suppressed emotions is supposed to find the possibility of exit without the recalled damage. However in the process of managerial, team games, where one should conform to norms worked out in the group, this mechanism is used even more often than in everyday life. *Sublimation,* works on the contrary, it has the task of converting the condemned urge into a socially useful activity; for example into the spirit of sport rivalry. Indeed, this mechanism is being perfectly integrated into the set of behaviors in the process of simulation games. It allows transforming instincts and emotions that are not accepted by the individual into beneficent actions, for example authoritarianism into leadership, aggression into aspiration to the victory. In addition it isn't necessary to involve no specialists to this transformation (what is necessary in everyday life). The mechanism of *rationalization* consists in searching objective in interpretation of the individual, arguments justifying the taken decision. Two types of rationalization exist. Each type appears during simulation games. First - „*sweet lemons*" – it has the task of raising advantages of a bad decision which could be taken rashly and in a hurry. A following example illustrates it. In the course of the „ForMarkt" game conducted on 9th semester of the Management and Marketing course, 5 groups participated. All groups had even chances to win, but since the beginning one group occurred to have most chances of the victory, according to the opinion of the rest. Members of this group through the first part of the games dominated and they were winning, but then the group relaxed and took an irrational decision, which in consequence has led to their defeat. Members and the frontman of the team didn't accept the mistake they committed, they rationalized it, e.g.„the decision was *O.K., it was the market that changed*" or „*we were OK. – they were not" „second place is still Better than last place*", etc. Second – „*sour mandarins*" – is lowering the value of the decision which occurred to be exceptionally accurate. During the „ForMarkt" game, when a leader of the entire group was totally crushed, the team that won wasn't exceptional in comparison to the rest. Members of this team didn't believe in victory and they justified it with chance, they often used expressions, like: „*we managed*", „*we had luck*" etc. Proverbs confirm the existence of rationalization in life of everyone of us from ages. It is possible to assign the first type of rationalization to proverbs, like: „*better an egg today than a hen tomorrow" and „half a loaf is better than no bread"*. Second type of rationalization is well illustrated by other proverbs, however perfectly showing the mechanism of performance: *„beginner's luck",* what is confirmed by quoted statements of students at the recapitulation of the games.

Fantasizing causes adopting false contents, including fantasies and dreams (usually unrealistic) to a subscribed system of values.

Projection consists on assigning other own views, behaviors or features (mostly negative ones). It is caused by a bigger availability of those opinions, behaviors and characteristics at the person that has them, so it becomes easier to subsuming them under the given category. During the game one of participants is screaming at another because thinks that he is exceptionally aggressive. In fact alone he is ag-

gressive. As usual in case of defensive actions we deal with two aspects: avoiding frustration (the player doesn't has to feel unfair for scolding the friend) and distorting reality (the scolded player is suffering and he doesn't understand, why he is being reprimanded). The projection can be dangerous, because it often justifies aggressive behaviors by underpinning the faith in aggressive attitude of the entire world and the necessity of self-defense. Then it is becoming a typical symptom of paranoia. Compensation is rewarding oneself for gaps or defects. It is giving temporal pleasure, but repeated might cause establishment of subconscious association of the given defect with an award and to hamper elimination of this defect. A young man considers himself unattractive e.g. in terms of physics and socially, so he recompenses it by participating in games under another figure (often created as the opposite to the real one). It is also possible to use this term in a slightly different meaning – of directing the activity on goals similar to those that we are not able to reach and what finds its reflection in simulation games.

Defense mechanisms are playing the great role in the realization of scenarios of simulation games. Because they permit to know the spectrum of mechanisms characteristic of individual players. Therefore every summing up the simulation game should contain elements of the interpersonal training, explaining behaviors of participants in the process of the decision making in the game.

There is a common opinion that simulation games (including those players online In the Internet) bring not only good fun, but also devilry. Authors have already mentioned about the bad affect of games on their participants. Still, we mustn't forget that such activity also shape positive characteristics of players. In Internet games participants share information, are giving some hints to them how to promote, how to defeat the enemy. Experienced players give a precious weapon to new players, that is the willingness for helping is infecting everyone which are interested in such a way of spending time. It also happens sometimes that such behavior has a superior goal that requires cooperation between players. Without this cooperation the success would be impossible to achieve.

5.6. Simulations of conflicts

Let's accept that simulation is:

> *Use of a material or formal object in a view to constructing, using a model or examining and experimenting guaranteeing the inviolability of the real system*[23].

[23] Latawiec A., *Za czy przeciw symulacji świadomości*? *[Pro or against simulation of consiousness?]*, Symulacja Systemów Gospodarczych, Antałówka'97, Warszawa 1997.

If we assume that the conflict escalator built by F. Glasl (see fig. 6.4.) is a model, it can be only a dynamic model. In that case, is it possible to subject processes included in this model to simulation? Let us consider some „pro" and „against". Evans, Wallace, Sutharland treat the simulation as a process of formulating the history of states; they assume the use of a model for chronological generating a story of states of his model, which is perceived as a history of states of the formed system.

Analysis of above expressions allows regarding the escalator of conflicts as a simulation model, since[24]:

1. It is possible to consider the escalator of conflicts as a model (it was drawn up on the basis of the wide research on organizational conflict by F. Glasl and it corresponds to the course of conflicts in reality),
2. It has an internal defined structure, which elements mutually depend on themselves,
3. The postulate of chronology of generated states (stages) of the system has been fulfilled.

Unfortunately it is difficult to consider a conflict as the financial or formal object, because no premises which would guarantee its invariability exist in changeable environment.

> ***A conflict*** *is possible to treat as connecting the nominal model, interpreted as a hypothetical construction of ideas and the real model interpreted as a system isomorphic to the examined system, which however has a simpler structure*.

Determining the amount and quality of information that would constitute the basis for building the database necessary for the simulation becomes the main problem[25].

The conflict escalator presented on the figure 6.4. creates a whole range of limitations. First of all, its complexity becomes perplexing for cognitive effects of the simulation.. Each of three phases can constitute an individual model , and each from three stages conformable to a phase can be treated as individual model (because it is fulfilling demands concerning the structure of a model that has been presented above). If so, it is every stage from the escalator of conflicts can be

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[24] Więcek-Janka E., *Psychologia gier symulacyjnych [Psychology of simulation games]*, Prace Naukowe Instytutu Organizacji i Zarządzania Politechniki Wrocławskiej, Seria: Studia i Materiały, Wrocław 2004.

[25] Więcek-Janka E., *Dylematy Symulacji Konfliktów [Dilemmas of the Simulation of Conflicts]* in: Symulacja Systemów Gospodarczych [Simulation of economic systems], Prace Naukowe Instytutu Organizacji I Zarządzania Politechniki Wrocławskiej, Seria: Studia i Materiały nr 75/15, Wrocław 2003.

treated as the nanomodel. According to the definition of Balcerak and Pełech[26] a simulation nanomodel is „*the simplest simulation model possible that is projecting individual elementary actions that can be distinguished in the original situation on the lowest recognized hierarchical level"*. If we assume that it is possible to treat every stage of escalator as a simulation nanomodel, according to the definition of the complete simulation model it is possible to treat escalator of conflicts as a simulation model. The analysis of problem's definition points at the fact that we deal with variables, which aren't undergoing the parameterization easily. Those are[27]: attitudes, opinions associated with emotions, phobias, the awareness and the culture, which are variables put under operations of the changeable environment(situation on the market, style of management, personal characteristics of superiors and partners, etc.) that violently or evolutionally change. Therefore every nanomodel in the conflict escalator, which variables determine the occurrence of a „cold" conflict should have their „hot" equivalent and take under consideration the influence of the environment. Variables characterizing the „temperature" of the conflict are mostly resulting from the subjective sphere, therefore they are tacit, immeasurable and often they are dispersed. The problem appears in the simulation of the area directly related with consciousness[28], personality[29], behaviors, attitudes or motives. Initial variables of the model described in the objective area and related with changes of the organizational structure or with creating particular organizational units seems to be rather easy to simulate. The next dilemma related with simulation of conflicts concerns the guarantee of inviolability of the real system. Because of the dynamic and idealistic character of described model stated a priori it is possible to discuss its connection with reality (specific for every organization) and even more – the guarantee of inviolability of the described reality[30].

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[26] Balcerak A., Pełech A., *Nanomodele symulacyjne – zarys pomysłu [Simulation nanomodels – draft of idea]*, in: Symulacja Systemów Gospodarczych [Simulation of economic systems], Antałówka 1997.

[27] Latawiec A., *Za czy przeciw symulacji świadomości*? *[Pro or against simulation of consiousness?]*, Symulacja Systemów Gospodarczych [Simulation of economic systems], Antałówka'97, Warszawa 1997.

[28] Latawiec A., *Za czy przeciw symulacji świadomości*? *[Pro or against simulation of consiousness?]*, Symulacja Systemów Gospodarczych [Simulation of economic systems], Antałówka'97, Warszawa 1997.

[29] Gąsiorowska A., *Człowiek jako ofiara symulacji [Man as a victim of simulation]*. in: Symulacja Systemów Gospodarczych [Simulation of economic systems], Antałówka'98, Warszawa 1998.

[30] Więcek-Janka E., *Dylematy Symulacji Konfliktów [Dilemmas of the Simulation of Conflicts]* in: Symulacja Systemów Gospodarczych [Simulation of economic systems], Prace Naukowe Instytutu Organizacji I Zarządzania Politechniki Wrocławskiej, Seria: Studia i Materiały nr 75/15, Wrocław 2003.

So, is the simulation of conflicts for raising the efficiency of recognizing them and solving legitimate? – Definitely yes. It is important to perform interpersonal and intergroup workshops that would contain simulation of conflicts, at least for increasing the base of organizational and personal experience. The chapter 7 presents a conspectus of simulation workshops.

5.7. Internal and external locus of control

Locus of control, LoC according to the Rotter concept, is[31]:

> *Attitude, expectation, anticipation of the nature of causalities between behavior and its consequences[32].*

Persons having internally situated sense of control (inner-directed) believe that situations they are in are mostly resulting from their own actions. Persons with a strong sense of external control have the opposite opinion – they believe that their successes and failures result mostly from external factors, especially other people, lucky or unlucky coincidences. Strong sense of outside control is blocking the activity and the responsibility. People with a stronger sense of internal control are – comparing to externally-directed ones- more active in their aspiration to gain the target, more sensible to information that can be useful in their actions, more willing to learn on basis of own experiences, they are more motivated to achieve new objectives and they are more resistant to stress[33], as well as they tolerate risk more easily. High internal locus of control is positively correlating with school and academic achievements[34]. The inner-directed-ness grows with the level of education[35].

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[31] Rotter J.B. 1990. *Poczucie wewnętrznej versus zewnętrznej kontroli wzmocnień [Feeling the internal versus outside control of reinforcements]*; [in:] Nowiny Psychologiczne 5/6; pp. 59-70.

[32] Więcek-Janka E., Balcerak A., *Poczucie umiejscowienia kontroli u uczestników symulacyjnych gier kierowniczych. Badania wstępne [Feeling the locus of control at participants of simulation managerial games. Preliminary examinations]*. Modelowanie symulacyjne systemów społecznych i gospodarczych [Simulation modeling of social and economical systems], Wrocław 2006.

[33] Kozielecki J., *Koncepcje psychologiczne człowieka Human psychological conceptions]*. Wydawnictwo „Żak", Warszawa 1995.

[34] Nelson E.S., Mathia, K.E.. *The Relationships among College Students' Locus of Control, Learning Styles, and Self-Prediction of Grades*; [in:] *Education Research and Perspectives* 22(2); 1995, p. 110-117.

[35] Forte A., Locus of Control and the Moral Reasoning of Managers; [in:] *Journal of Business Ethics* 2005/ 58; p. 65-77.

Feeling the locus of control influences a lot of decisions which people are making along their lives – most of all those are decisions concerning own development and the path of own career.[36] So, it happens that:

Persons that are strongly externally-directed unwillingly make independent decisions, they don't have leadership qualities and they feel better on line positions.

Persons strongly inner-directed willingly take the responsibility and the risk; therefore they fit better to autonomic positions that require skills in fast taking managerial decisions.

Ambisteerable persons feel well in the role of a subordinate, but also of the superior. This allows them to fit their behavior to each situation. They suit best on position of middle level managers.

Feeling the locus of control is developing in interactions man – environment and is changing under their influence (the stability of feeling of locus of control is peculiarly low in the age of adolescence). There are also situations, when persons who are generally externally directed, behave in a way that proving about internal feeling the control, because their experience resulting from similar events allows them to believe that they are able to control *this type of situations*. So – since feeling the locus of control has an acquired and changeable capacity, it is possible to try to affect it by providing situations, in which LoC might be regulated. Participation in simulation games is one f such sort of experiences[37].

It is possible to consider the connection of feeling the locus of control with the involvement in managerial games in three aspects. First: *LoC of participants of serious games probably affects their (games) efficiency, i.e. realization of educational, interpersonal and organizational objectives.* Numerous factors having impact of the efficiency of serious games can be grouped in following sequence: [38]

Factors connected with the game in the objective meaning: kind of interaction between participants, the scope of reflection, its realism, level of openness and apparentness of the model, presence of the random factor, complexity of the game (minimum time required for conducing the game, number of decisions that are taken on each step of the game, number of system variables, amount of dependencies between those variables).

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[36] Coleman M., DeLeire T. An Economic Model of Locus of Control and the Human Capital Investment Decision; [in:] *Journal of Human Resources* 2003/38(3), pp. 701-721.

[37] Więcek-Janka E., Balcerak A., *Poczucie umiejscowienia kontroli u uczestników symulacyjnych gier kierowniczych. Badania wstępne [Feeling the locus of control at participants of simulation managerial games. Preliminary examinations]*. Modelowanie symulacyjne systemów społecznych i gospodarczych [Simulation modeling of social and economical systems], Wrocław 2006.

[38] Balcerak A., *Walidacja operacyjna dydaktycznych gier kierowniczych* [Operating validation of educational managerial games]; [in:] *Symulacja Systemów Gospodarczych [Simulation of economic systems]. Prace Szkoły Antałówka'2000;* WSPiZ, Warszawa, 2000, pp. 47-64.

Factors associated with the organization of the game: time and place dedicated to the game, course and form of recapitulation of the game, length of time breaks between stages of the game, time pressure, method of creating decisive teams access to decision support systems.

Factors associated with the person of the arbiter: competence among others tolerance of uncertainty, timing, skills of observation and interpretation of behaviors of players, relations with the game (dependently if it is its author, ex-participant, how many times did he moderate it), appropriate motivating factors (penalties and awards: verbal and material, making the note from the course dependent from the result of the game), personality, knowledge and experience.

Factors associated with participants of games: features of personality, style of the process of making decisions, internal motivation, attitude to the game, education and educational achievements, involvement in the teamwork decision-making, division of the teamwork.

Examinations of psychological factors concerning participants, arbiter and interactions between participants and the arbiter are assumed to be the most difficult. Their significance hasn't been always appreciated, especially in cognitive games. Second: *Simulation managerial games can be used as a tool of a training of inner-steerability*[39]. This aspect of „psychological training" through simulation games, even cognitive ones, seems to be important in relation to research concerning the locus of control, conducted amongst managers:

– groups managed by inner-directed leaders have better achievements, than directed by outside maneuverable ones;
– inner- and outer-directed managers differ with styles of management; inner-directed are trying to influence for keeping subordinates with persuasion, outer-directed rely more on the compulsion.

Routine tasks are triggering the increase of motivation at outer-directed, however the fall motivates inner-directed. Because outer-directed prefer the work under brightly determined control, however inner-directed prefer decentralized principles of the decision making process.

5.8. The role of moderator in the game

Keys and Wolfe[40] remind that in the early stage of development of modern games the managerial role of the moderator was rather underestimated. Simulation

[39] Więcek-Janka E., Balcerak A., *Poczucie umiejscowienia kontroli u uczestników symulacyjnych gier kierowniczych. Badania wstępne [Feeling the locus of control at participants of simulation managerial games. Preliminary examinations]*. Modelowanie symulacyjne systemów społecznych i gospodarczych [Simulation modeling of social and economical systems], Wrocław 2006.

[40] Keys B., Wolfe J., *The Role of Management Games and Simulations,* Education and Research Journal of Management, June 1*, 1990;* 16(2): 307-336.

games were treated as a „self-teaching" tool. Further research of Starbuck and Kobrow[41] in 1966 illustrated that constant care of an instructor and consulting in crucial moments of the game is the essential condition of an efficient use of a didactic simulation game. The person running the game (moderator) is responsible for its technical and organizational preparation, he is guaranteeing the procedural correctness and efficient course and he help participants of the game to put their experience in order and generalize it at the end of the game[42]. Many times he is performing the role of the environment in the game (e.g. the bank, expert, consulting company representative, etc.). His influence on the teaching effectiveness of the completion of the simulation game is undoubted. Success of active teaching methods (including simulation games) depends on competences of the teacher; some of most important are:

- tolerance of uncertainty (resulting from the fact that during classes often occurs situations that were impossible to plan, or even predict);
- ability of observation and interpretation of behaviors;
- ability of formulating questions concerning behaviors and skills of listening answer to these questions;
- ability of accepting, depending on needs, a directive or underactive attitude;
- timing.

Lewowicki[43] adduces on research, from which result conclusions that the democratic style of running classes was beneficent for their efficiency when participants are older pupils and students, when a high level of independency of students is required and when it is used during classes with a high level of difficulty (during classes with a lower level of difficulty an autocratic style turns out to be more effective). So, it is possible and to suppose, that in case of managerial simulation games one should recommend the democratic style. However, the educational effectiveness of individual styles of management is in some level step dependent on trainee characteristics. For example, persons with a high level of intelligence take more benefits from classes run in a democratic way, while less intelligent people[44] often obtain a greater increase of information and skills during classes run in a authoritarian style.

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[41] Starbuck W.H., *The Effects of Advisors on Business Game Teams, American Behavioral Scientist,* Vol. 10, No. 3, 1966, p. 28-30.

[42] Więcek-Janka E., Balcerak A., *Poczucie umiejscowienia kontroli u uczestników symulacyjnych gier kierowniczych. Badania wstępne [Feeling the locus of control at participants of simulation managerial games. Preliminary examinations]*. Modelowanie symulacyjne systemów społecznych i gospodarczych [Simulation modeling of social and economical systems], Wrocław 2006.

[43] Lewowicki T., *Proces kształcenia w szkole wyższej [Process of education in an institution of high education],* Państwowe Wydawnictwo Naukowe, Warszawa 1988, p. 177.

[44] *Keys* B., *Wolfe* J., The *Role of Management Games and Simulations,* Education and Research Journal of Management, June 1, *1990*; 16(2): p. 307-336.

Another essential condition of the teaching success is showing an emotional commitment by the person running classes, in reference to the contents of classes and the very process of educating. Also Rosenshine and Furst[45] have found the correlation between the increase of achievements of pupils and the ardor presented by the teacher. The activity of the arbiter and help given to participants of the game can't be ever be transformed into an active participation in the game or cooperation with one of teams playing the game[46].

The efficiency of the didactic game depends on the force of relations between the arbiter and the game used In the match, former contact with the game, his experience concerning the game, Whether he was already playing the game earlier as a participant or if He is the author or co-author of the game. Practitioners of games think, that best for players, as well as for the very game, is having an experienced moderator who was earlier a participant of played game, because thanks to this experience he will understand roles that students incarnate, he will be able to give them practical hints. It is also better when the moderator is not the author of the game because he will not react emotionally on any potential critic of the model as a person that isn't involved in the process of creating the game. Bielecki[47] states that the course of the game is affected efficiently by the situation when the arbiter of the game is the creator of the model. The problem of the authorship can influence the effectiveness of the game at the stage of choice of the game for the realization of deliberate teaching objectives. Awarding the success in a managerial game – for example by taking under consideration the result of the game In the construction of final note of the course – is one of most controversial methodological issues. The result of the game can be evaluated relatively or absolutely (in reference to results of other participants). Absolute assessment on basis of game's results is used by the majority of teachers using games in their didactic process. Apart from objective principles depending on the team, the time of the games or the level tiredness, one apply a subjective evaluation. In case of behavioral simulations – in opinion of many people – results of games shouldn't affect the evaluation of classes. The assessment should be made on basis of oral and written reports of the game. Possibly, the efficiency of motivation stimulated by evaluation of the game is related with the level of realism and range of reflecting reality in the game. Although others bring arguments that even in realistic games the result of each game depends in

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[45] Rosenshine B., and Furst N., *Instructional conceptions: Analysis from an instructional design perspective* International Journal of Educational Research Volume 41, Issue 6, 2004, p. 429-444.

[46] Bielecki W.T., *Przedsiębiorczość w wirtualnym środowisku [Entrepreneurship in the virtual environment]*. Aspekt dydaktyczny. Wydawnictwa Naukowe Wydziału Zarządzania UW, Warszawa 1999, p. 236.

[47] Bielecki W.T., *Przedsiębiorczość w wirtualnym środowisku [Entrepreneurship in the virtual environment]*. Aspekt dydaktyczny. Wydawnictwa Naukowe Wydziału Zarządzania UW, Warszawa 1999, p. 237.

some range from luck and in competitive games – also from knowledge, skills and involvement of co-participants of the game. Supporters of transposing results of the managerial game on final notes of the course claim that managers are evaluated in their work on basis of results they obtain, while opponents of his approach state that relating the note concerning particular classes from results obtains in an educational game is a tacit taking the right of making mistakes, analyzing and repairing them away from participants of the game[48], i.e. taking from them, what is most often enumerated as one of greater advantages of educational simulation games. If learning through making mistakes and repairing them is one of most efficient method of gaining knowledge , implementing rewards, i.e. external motivation, for the result of the game will lower the potential of effectiveness of defined game from its start.

There is a wider context of the influence of the evaluation of the game on its educational effectiveness: the influence of all sorts of external motivators (awards and penalties) on the efficiency of the process of study. A reward is a factor that can affect on taking some sort of action, as well as on a choice of a method of operating. Opponents of the application of awards prove that people externally motivated (waiting for an award) use less sophisticated cognitive strategies, they choose easier solutions, they are less creative during the process of solving a problem than those, who don't expect any reward. Awards weaken the tendency to take risk, and sometimes they might reduce the influence of the internal motivation of individual participant. According to Nęcka[49] it results from the devaluation of the task, to which „*a price was set*"; the man subjected to outside motivation is discovering, that action which isn't entailing the award alone in himself isn't worth the withdrawal. So, rewards can have a peculiarly destructive role if they are being granted for tasks „*interesting by nature*", which relaying could be steered by the inner motivation. Therefore it is so important to distinguish tasks "*not interesting by nature*" and those, which are perceived as not interesting – in result of their excessive difficulty or simplicity. In his case steering the level of difficulty of realization of the task has more sense than using a „*bribe*", offering an award. Cameron and Pierce[50] have examined the influence of awards on the inner motivation; they have found that relating an award with reaching a certain level of realization of the task brings more satisfaction and content, than relating the reward with finishing (realizing) the

[48] Balcerak A., *Zorganizowana refleksja. Sens, forma i przebieg podsumowania rozgrywki gry symulacyjnej [Organised reflection. The meaning, the form and the course of recapitulating the games of the simulation game]*, Symulacja systemów społeczno-gospodarczych [Simulation of socio-economic systems], Prace Naukowe Instytutu Organizacji i Zarządzania Politechniki Wrocławskiej, Wrocław 2005.

[49] Nęcka E., *Psychologia twórczości [Psychology of creativity]*, Gdańskie Wydawnictwo Psychologiczne, Gdańsk 2002.

[50] Cameron J. and Pierce W. D., *Reinforcement, Reward, and Intrinsic Motivation: A Meta-Analysis,* Review of Educational Research, vol. 64, 1994, p. 474-482.

whole task. In Nęcka's opinion, the inefficiency of awards results from the fact that they are often interpreter as „*penalties in disguise*"; people are suppressing the creativity choosing „*safe*" methods of acting because they want to avoid the penalty (= lack of award). Moreover, rivalry for awards is evoking jealousy and it is devastating interpersonal relationships. Praise (a so-called verbal award) is a specific case of award. Praise as verbal awards can be equally destructive as other external motivators. Older children, but also adults (especially women) can interpret praise as reminding about the dependency from the praising person. Praise can be contrary to it, what praised alone thinks about his work. If the reaction of the teacher is informative (it doesn't have features of a praise, i.e. verbal award), the student is not mislead by the urge of seeking for approbation (i.e. for the award) and he remains free in his way of choosing methods for reaching his objective and his actions are directed by the internal motivation.

Thematic questions for the chapter 5

1. Characterize the term of motivation
2. Discuss how different types of motivation affect the sense of satisfaction from games
3. Characterize individual assets necessary for initiating creative actions
4. Discuss factor of the game that lead to the extreme satisfaction and extreme dissatisfaction
5. Classify the attitude of a player in accordance to approaches of: Maslow, McClelland, Więcek-Janka
6. Discuss classical psycho-dynamic approach in the case of games
7. Classify emotions accompanying games
8. Characterize defensive mechanisms that are used in games
9. Characterize a conflict as a simulation model
10. Discuss LoC in situation of games
11. Characterize the role of moderator in games

Chapter 6
Presentation of chosen games

6.1. Games with a messenger

6.1.1. Introduction

The described game is facilitating conducting the simulation of conflictual situations and it is combining affective and structural elements. It is a team game, which in combination with other games is bringing educational positive effects. During the match a record is being made, which enables the participants of the game observing the process of making own decisions, as well as decisions of other teams[1]. The determined game is based on the iterated prisoner's dilemma and it consists in playing the same game many times. Then, each player has the possibility to punish his opponent for cheating in former round. In such situation, if losses resulting from his punishment will prevail profits over expectations, the cooperation between both players has the chance to shape a state of balance. Such game can also have many other states.

6.1.2. Goals of the game

The goal of the game is to approximate fundaments of the game theory with application of the prisoner's dilemma.

6.1.3. Rules of the game

The group is being divided into 2–3 personal teams; one half of them are being named blue and the other part – red team. Teams divided into different colors are situated in different rooms (blue and red are separate), so that they would not see what is happening in the team, with which the conflict is taking place. In the process of the game teams will be making eight decisions on emitting signals and two decisions on the withdrawal of negotiations with the representative of the opponent. There is a messenger who is transmitting decisions on prepared forms be-

[1] Woźniak J., *O szkoleniach z umiejętności miękkich i symulowaniu konfliktów na przykładzie ćwiczenia wykorzystującego „dylemat więźnia" [About trainings in soft abilities and simulating conflicts on the example of the exercise using „ prisoners' dilemma"]*, Modelowanie symulacyjne systemów społecznych i gospodarczych [Simulation modeling of social and economical systems] (ed.) Balcerak A., Kwaśnicki W., Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2006, p. 91-103.

tween groups (rooms). The messenger is revealing the message that he has in possession if and only if he has decisions from two opposing teams.

All participants of the game are informed about objectives of the organization, about principles and the table of payoffs in the introduction of the game.

6.1.4. Dynamics of the game

Every blue team is exchanging decisions and negotiating with counterpart red team and making eight decisions about sending a signal consisting letters X and Y. Teams have at their disposal three types of signals written in forms:: XX; XY; YY. Meetings of signals, given off by opponent teams, are being judged according to the table of payoffs made available to both sides (see table 6.1)[2]. The result of the duel in the fifth round is arising through multiplying by 5, whereas in the eighth round through 10.

Table 6.1.

Red group / Blue group	XX	XY	YY
XX	R -20 B -20	R -20 B +20	R -40 B +40
XY	R +20 B -20	R 0 B 0	R -20 B +20
YY	R +40 B -40	R +20 B -20	R +20 B +20

The scoring in the game depends only from values attributed by the table to meetings of two-letters signals send by teams and it is being added up in cumulative terms for every team individually. During the entire games representatives of opposing teams can communicate with themselves only twice. The condition of such meetings is a harmonious making a decision about entering in negotiations and appointing one person for conducting them. The purpose of such meeting depends exclusively on participating teams[3].

Similarly to the "*prisoner's dilemma"*, the matrix of payoffs is provoking making decisions of competing XX when the other side is sending more cooperative

[2] Table of payoffs is a three degree „prisoner's dilemma".

[3] Woźniak J., *O szkoleniach z umiejętności miękkich i symulowaniu konfliktów na przykładzie ćwiczenia wykorzystującego „dylemat więźnia [About trainings in soft abilities and simulating conflicts on the example of the exercise using „ prisoners' dilemma"]*, Modelowanie symulacyjne systemów społecznych i gospodarczych [Simulation modeling of social and economical systems] (ed.) Balcerak A., Kwaśnicki W., Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2006, p. 91-103.

signals: XY or YY. If we accept an assumption that the other side will send competing signals, decisions that are made have a more defensive character; also competing XX or accepting the loss of points.

The possibility of two-time meeting of opposite sides is entering ambivalent behaviors into the games. From one side the realization of rules established together give a sense of security; from the other side in the eighth round (in which the scoring is 10 times higher) occurs a serious decisive dilemma: should we work out trust or should we betray and win?

Along the game it is possible to notice different patterns of matches most often connected with the decision making after conducted negotiating talks[4]. Typical patterns of matches are presented in the table 6.2[5].

Table 6.2. Typical patterns of matches

Number of the round	Cooperating groups	Initially competing groups	Groups cooperating with „betray"	Groups cooperating with „mutual betray"	Constantly competing groups
1.	YY YY	XX YX	YY YY	YY YY	XX YX
2.	YY YY	YX XX	YY YY	YY YY	XX XX
3.	YY YY	XX XX	YY YY	YY YY	XX XX
4.	YY YY	XX XX	YY YY	YY YY	XX XX
talks	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes No
5.	YY YY	YY YY	YY YY	YY YY	XX XX
6.	YY YY	YY YY	YY YY	YY YY	XX XX
7.	YY YY	YY YY	YY YY	YY YY	XY XX
talks	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
8.	YY YY	YY YY	XX YY	XX XX	XX XX
result	Good but equal for both sides	Good but equal for both sides	Very good for the side playing XX in the 8th round	Bad but equal for both sides	Very Bad for both sides

[4] Woźniak J., *O szkoleniach z umiejętności miękkich i symulowaniu konfliktów na przykładzie ćwiczenia wykorzystującego „dylemat więźnia[About trainings in soft abilities and simulating conflicts on the example of the exercise using „ prisoners' dilemma "]*, Modelowanie symulacyjne systemów społecznych i gospodarczych [Simulation modeling of social and economical systems] (ed.) Balcerak A., Kwaśnicki W., Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2006, p. 91-103.

[5] Ibid.

6.2. The mafia game

6.2.1. Introduction

„*The mafia game*" characterizes with an enormous flexibility of rules, thanks to which it is possible to play it in an almost unrestricted number of participants (together, or after dividing in independent teams). Original rules of a game were drawn up by Dmitrij Dawidow in year 1986 on the Faculty of Psychology of the Moscow University[6]. Initially the game was played in lecture halls and dormitories of the university. However, gradually it has become the more and more popular in other soviet schools and in 1990 it trespassed borders becoming popular in Europe and later in the USA[7]. At the moment the game is popular worldwide. Actively associations, clubs and circles of acquaintances playing the mafia regularly operate in many countries and cities. The game is also being used in various trainings. Principles of some varieties of the game were patented. Special sets containing principles and useful stage props are already available in sale[8].

6.2.2. The goal of the game

The game requires and develops abilities of observation and analyses of behaviors, of drawing conclusions, convincing, as well as the control of the body language and other non-verbal signals.

6.2.3. Rules of the game

The game consists of rounds divided to successive in the established order stages - the division into fractions and alternating phases of the night and the day.

6.2.4. Division into fractions

In the beginning of each round players conduce a ballot of roles and they divide the group into two groups: honest (city) and mafia. The number of participants in the faction is conventional, but in the original version of the game it is being determined from above, in accordance with following scheme: 6–7 players – 2 mafias; 8–10 players – 3 mafias; 11–13 players – 4 mafias; 14–16 players – 5 mafias[9].

After conducting the draw every player should know only his own factional membership. The public disclosure of this membership by showing the fate before finishing the round is disqualifying the player from it. The factional membership of

[6] http://www.princeton.edu/~mafia/history.htm
[7] http://www.princeton.edu/~mafia/
[8] http://www.princeton.edu/~mafia/history.htm
[9] http://www.princeton.edu/~mafia/

players eliminated from the game in other way should remain in secret, however it is often revealed at immediately.

6.2.4.1. Night

At night all players „fall asleep"(they are closing or covering eyes), it is also possible to cover curtains in the room, to turn the lights out, etc. The mafia is "waking up" simultaneously after the signal of the master of the game (in the original version of the game – only the first night with a view to getting acquainted). Each night (usually besides the first one) members of the mafia delegate a player that they want to eliminate from the round. They can undergo it by silent showing the player the master of the game, or by writing his name on paper, like in original rules of the game (in such case there is no need to "put players asleep" and the honest write any established word, for example "city"). In case of the nonconformity amongst the mafia nobody is being eliminated, however a majority of mobsters, or the "godfather" – the member of mafia with highest rank, decides (if there has been established a hierarchy). The eliminated player until the end of the round is only watching the games (also during the night), but he cannot communicate with other players in any way. Such players can take the special place in the room so that it would be visible at first glance that stayed in the game. After finishing the phase of the night all players "are waking up" in order to begin the consecutive phase of the day[10].

6.2.4.2. Day

At the beginning of this phase players learn who was eliminated, as well as how many members of the mafia stayed in the game. It take place by reading notes from paper sheets written and mixed during "the night" or, in case of lack of sheets, the master of the game is giving necessary information. Next a discussion full of speculations and suspicions is starting. Honest players are trying to detect mobsters, and mobsters are bluffing casting suspicion on remaining (they can also mislead opponents by appoint each other). Everyone can accuse other player for the membership in the mafia. After justifying the accusation the player has the right to defense, and then a voting is taking place. The accused can be excluded from the round by a majority vote. Otherwise players are continuing discussion.

The phase of the day finishes on request of the majority, most often after eliminating a player. After the phase of day another phase of night takes place.

6.2.5. End of the round

Every round is ending in the moment, when one of factions is eliminated. Still, it is worth to notice that when the mafia obtains numerical superiority eliminating

[10] Ibid.

the city is unavoidable. Remaining persons or all members of the victorious faction win the game. The winner mobsters receive an amount of points equal to the initial number of honest players. Honest players receive as many points, as many they have been left in the game. It is also entirely to resign from the scoring.

6.2.6. End of the game

The game is most often finished when one player gains a determined number of points or when after the end of the round players agree to end the game.

Rules of a game can be modified almost freely – changing considerably the climate, character, attraction and the level of difficulty. Before beginning the game one should make sure that principles are clear for all players, explicit and aren't colliding with them. It is also worth to notice exceptional situations, like revealing the result of the Draw or absolute resignation of any player from further participation in the game. Some exemplary modifications of the game are presented below:

6.2.7. The story

It is worth to introduce a story to the game for making it more attractive. In such situation it is important in the phase of choosing the master of the game to his imagination and skills of narration. It is possible to invent the story freely so that it matches assumptions resulting from accepted rules of a game.

6.2.8. Requisites

Inserting different requisites, like presented below, affect the adequate atmosphere and increasing the convenience of the game[11]:

- Percussion cap pistol – used in the day and at night for eliminating players from the game, in such case, for obtaining a better effect, the master of the game should have to possibility to approach noiselessly to each player
- Candles standing in front of each player, they are symbolizing their "*lives*"; they are being extinguished while individual player "dies".
- Plates with fictitious names
- Blindfolds

6.2.9. Additional roles

In the game it is possible to introduce assigned additional roles to one or many persons; they are giving additional possibilities to players playing them. These roles can be assigned to the faction, or distributed by additional draw (in such case it is possible to make various combinations, like "gravedigger from the mafia"

[11] Ibid.

or “honest gravedigger”). Implementation of new roles can often make the game „in the night” In accordance with classical rules (sheets of paper) impossible and it forces out the presence of the master of the. These are exemplary roles (roles and possibilities can be almost absolutely freely modified or combined, depending from the idea of participating players):

1. **Commissioner Cattani** (**Policeman, Detective, Inspector, Angel**) – most popular of additional roles, this figure is always a member of a faction of honest players, each night he is waking up and he is getting to know (most often through the silent communication with the master of the game) factional membership of the player chosen by oneself. The commissionaire can use the acquired knowledge during the day (sometimes it is worth to reveal everything and “commit suicide” presenting own identification card by showing the result of the ballot). Depending on arrangements of players the commissioner can wake up after or before the mafia. In case of beginning the game in the night without the master of the game the inspector should have the possibility of silent checking the result of drawing of any player. In case of implementing the bulk of policemen one should establish, whether they are waking up simultaneously checking the person chosen together, whether one after the other checking different people, however not knowing the identity of remaining policemen or results of their investigation.
2. **Lawyer** – he can appear one time during the game in the moment of voting other person down protecting him from the death (depending on arrangements of players it can finish the day or protect this person from further accusations).
3. **Miracle-worker (Savior) –** he can appear one time during the game and resurrect the eliminated person (depending on arrangements accepted by players before the game it can be a person dismissed only in the day, only at night, only previous night/day, or any person).
4. **Wizard (Magician)** – one time during the game he can show to the leading „during the night” an agreed sign, after which he „wakes up” and point at two persons that he will switch cards (and roles). Immediately after this action all players "are waking up" one more time in order to examine one's cards.
5. **Gravedigger** (**Terrorist**) – he can appear one time during the game in the day and eliminate any person.
6. **Judge** – he can appear one time during the game during voting to take advantage of one's law of the double voice.
7. **Mad judge** – ones during the game he can show to the master of the game an agreed sigh in the night, after which he “wakes up” and eliminates freely selected person.
8. **Blackmailer** – ones during the game he can show to the master of the game an agreed sigh in the night, after which he “wakes up” and point at one person that he “blackmails – the blackmailed person in purpose of knowing his blackmailer, which he must defend the next day during the discussion and on which he cannot vote.

9. **Terrorist** – in the moment of his death also dies the person that sits next to him (by the side determined before the game) or any person indicated by him; in this moment other players receive the information that the player was a terrorist.
10. **Madman –** one time during the round he can reveal himself and commit suicide, his action will end the debate.

6.2.10. Vendetta

In this variant every player is aspiring in the first day (optional to the end of the round) to liquidate one particular person participating in the game (depending or irrespectively of the role and the factional membership of this person). The person that should be eliminated can be determined for example by the number on drawn card, counting from his neighbor clockwise with omitting oneself. It is possible to obtain additional points for eliminating a person against which you are playing the vendetta (always, or only when the player survived or his faction won the round). This principle guarantees motivation for accusing in the initial phase of the game, when we aren't using the stage prop of the Bible and we aren't introducing additional figures. Moreover, it changes slightly the role of the commissionaire who besides revealing the fractional membership (and often the role) of particular player, he can also find the motivation of this player in the moment, when he accuses another person that can be innocent. In this variant there is also an additional obstacle in detecting the mafia because instead of searching the mafia, players often focus on elimination of persons against which they have the vendetta, and if a few players have the vendetta towards the same player, they can easily be taken for the mafia cooperating with themselves[12].

6.3. TransEuropa Game

6.3.1. Objectives of the game

Shaping and improving the ability of planning and coordinating action in the space and the time in the environment of restrictions is a purpose of the game. Moreover, the additional purpose making aware players, that one should treat planning all actions as the mean of accomplishment of the purpose, which one should exploit with the full liability[13].

[12] Ibid.

[13] The game has been elaborated in 1998 by Ewa Więcek-Janka and Marek Goliński as exercise for classes of the subject *„Organization of distribution systems*".

6.3.2. Rules of the game

An unrestricted number of teams' 2–3 personal is participating in the game – they constitute teams of trucks being a property of a certain trading company with the office registered on the area the EU. Because of the specificity of conducted activity produced goods must be distributed possibly quickly amongst buyers. A number and a list of towns constituting markets in Europe are well known. It is assumed that every team has one truck tractor with the semi trailer at its disposal, being able to hold 500 pieces of goods, and for two fuel tanks for 500l each (without the possibility of filling fuel up on the way) and 1000 euro for the purpose of ferry crossings and other payments.

The task consists on such planning a route of around the Europe in order to sell possibly the majority of 500 pieces of goods according to the established demand. It is being assumed that products can't be sold in the parent (base) city and that the car ruthlessly must come back to the base city with the working engine.

The demand for goods isn't developing identically in all cities and it will depend from the number of inhabitants and from the economic situation of the given country. In capital cities it is possible to sell the most: 10–15 pieces, in average cities 6–11 pieces, in little 2–7 pieces.

In the given city of Europe during the games the given team can make only one business transaction. The list of cities ranked among capital cities, average and small was included in the table 6.3. Localization with distances was placed in the figure 1. (possibility of using the Internet). The table 6.4 present the distribution of probability in shaping the demand in particular categories of cities (similar to the normal distribution). The effective demand is being obtained while drawing conducted by the arbiter, which will appoint the demand for every city.

The table 6.5 illustrates the list of ferry payments for ferry crossings available in the game. Exemplary course of the beginning of the router with the record in the table is presented in the table 6.6.

6.3.3. Course of the game

Participants get acquainted with rules of the game (10 minutes); they select the parent (base) city and organize the work (5 minutes); they work the route of transit out (30 minutes); after drawing up a plan teams are informing about results of planning (5 minutes); the moderator draws the size of the effective demand and proclaims it (10 minutes); calculating percentage deviation from the plan (10 minutes); presentation of results; solving the game (20 minutes)

Time of the game: 90 minutes

Table 6.3

Capitals	Average	Small
Moscow	Bergen	Stavanger
Kiev	Gothenburg	Lulea
Riga	Turku	Torino
Oslo	Kharkiv	St. Petersburg
Copenhagen – Stocholm	Kraków	Gdańsk
Warsaw	Brno	Poznań
Prague	Szeged	Miszkolc
Bratislava	Salzburg	Graz
Budapest	Baja Mare	Konstanta
Bucharest	Burgos	Plovdiv
Belgrade	Istanbul	Izmir
Tirana	Thessaloniki	Skopje
Sofia	Napoli	Bologna
Ankara	Geneva	Milan
Athens	Frankfurt	Monachium
Rome	Brest	Hamburg
Bern	Lyon	Groningen
Berlin	Barcelona	Callas
Amsterdam	Liverpool	Dover
Brussels		Bordeaux
Paris		Nimes
London		Burgos
Dublin		Seville
Madrid		Bradford
Lisbon		Birmingham
Helsinki		Belfast
Vienna		cork
Zagreb		

Table 6.4

sell of 10-15 pieces		sell of 6-11 pieces		sell of2-7 pieces	
Division of the probability of demand in capital cities		Division of the probability of demand in average cities		Division of the probability of demand in small cities	
probability	demand in pieces	probability	demand in pieces	probability	demand in pieces
0,10	10	0,10	6	0,10	2
0,15	11	0,15	7	0,15	3
0,25	12	0,25	8	0,25	4
0,25	13	0,25	9	0,25	5
0,15	14	0,15	10	0,15	6
0,10	15	0,10	11	0,10	7

Table 6.5

Ferry crossing	Payment in Euro
Gdańsk – Stocholm	150
Gdańsk – Copenhagen	120
Copenhagen – Goteborg	120
Bergen – Stavanger	120
Callas – Dover	100
Liverpool – Dublin	140

Table 6.6. Example of the commercial route plan

Name of the team		Base city					
Starting city	Destination city	dis-tance	grow-ing dis-tance	Sell plan	increas-ing plan	ferry cross-ings pay-ments	Real sell
Warsaw	Berlin	560	560	15	15	–	
Berlin	Prague	320	880	15	30	–	
Prague	Brno	260	1140	11	41	–	
Brno	Bratislava	810	1350	15	56	–	
Bratislava	Vienna	80	1430	15	71	–	

6.4. Simulation managerial game ForMarket (simulation of the manufacturing process in conditions of the changing market)

6.4.1. Objectives of the game

The ForMarket game has been prepared for support of the didactic process for students of stationary and extramural studies of first, second and third degree. The game can be one of elements testing the degree of assimilating the knowledge in the scope of study about management obtained during lectures, exercises, seminars or project classes. Suitable for the accomplishment of stages of the game requires from students taking specific decisions. The quality of these decisions is a rate of the level and of the degree of combining the acquired knowledge and skills[14].

Particular objectives of the game are as follows:

[14] The game has been prepared in 1998 by Ewa Więcek-Janka as exercises for „*Decisions and marketing games*" classes, basing on the Promar game.

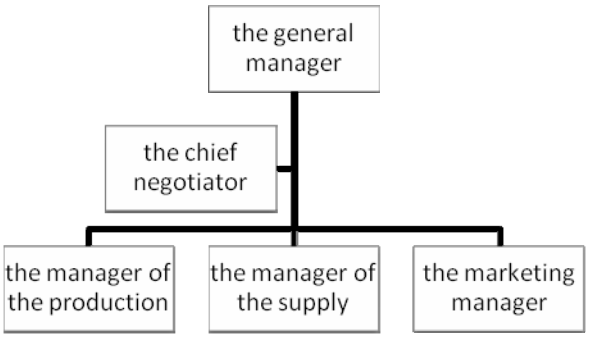
– Making aware of the importance of the decisive situation in non-manageable conditions, which future course can be determined with some degree of probability
– Developing the ability of the correct evaluation of own abilities in the context of own behaviors and behavior of partners in the team
– Verifying the ability of organizing the team work, of choice of the leader of the group, of making the division of work
— Developing the skill of acting in conditions of time limitations.

The game has been prepared in two variants:
– In the first case participants are using calculators
– In the second case the game is in progress using the PC and a prepared software program.

Just like in other games, in ForMarket game, luck is also deciding in some (small) degree deciding about the success of individual teams. However, this element cannot decide about the final result of a multistage undertaking, which is the participation in the game. Moreover it is important to notice that luck is on the side of the best prepared participants – such statement is supported by observation of the practice.

6.4.2. Characteristics of the game

In the game 4–5 economic units are competing with themselves, units are represented by 4–6 member teams. The selected group alone is dividing tasks and entitlements between participants, it appoints formal posts and determines areas of responsibility. The group should prepare the organizational structure (according to the knowledge acquired in the process of studies), for example:



Teams have the full freedom in shaping their structure. Appointing the director in every team is an only exception. Only decisions presented by the director are authoritative for the moderator of the game.

The described game concerns planning the production in the industrial enterprise in conditions of the uncertainty of the demand for final products and the supply of materials and raw materials. And so it is a game with a probabilistic character. Participants during the time of the game are acquiring the knowledge, which is reducing the risk of making similar mistakes. It is also a competitive game; it means that the behavior of participating teams affect the behavior of their competitors and the victory is taking place to the cost of competitors. The competitiveness of the game is increasing its probabilistic character. Not only the size and structure of the supply and demand, but also the behavior of other teams that affect the evaluation of final products and materials and raw materials are non-manageable variables (which are additionally only partially known).

Nevertheless competitive and consequently conflictual character of the game can be reduced by acceptance of agreements drawn between enterprises, for example:

Concerning the division of the market

Granting production subcontracts

Such arrangements can be contained during negotiations predicted in the organization of the game.

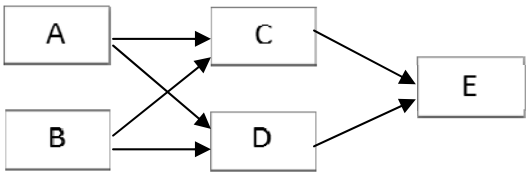
Every team can make a purchase of expert opinions concerning conditioning of the market. These expert opinions concern the supply of materials and the demand for individual products. The moderator of the game provides paid services in this range.

The top place in the competition belongs to the team that in the end of the game (i.e. after four quarters) obtains the biggest profit.

6.4.3. Problem situation

6.4.3.1. Production and technological structure

In the moment of start all competing groups have identical conditions. Each enterprise consists in five production units: A, B, C, D, E, in which they can realize five different technological operations: a, b, c, d, e,



Economic entities have the possibility to purchase two kinds of raw materials: **X** and **Y**, from which they produce four products: A, B, D and Z. These products are being bought by commercial organizations. Each of products is being produced according to technological plan. Described operations have been presented in the table 6.7.

Table 6.7

Order of operations	Products
A → C → E	**D**
A → D → E	**Z**
B → D → E	**A**
B → C → E	**B**

Technical and economical parameters of departments of the enterprise.

Each department has determined following factors: manufacturing capacity in units of work intensity in man-hours, cost of one man-hour in normal time (in zł), as well as overtime hours and fixed costs. In a production process it is possible to use overtime; however they cannot exceed 10% of the manufacturing capacity given to particular department. The arrangement of the manufacturing capacity was presented in the table 6.8.

Table 6.8

Parameters of the department	A	B	C	D	E
Quarterly manufacturing capacity in man-hours	1000	1200	1150	1250	2300
Cost of 1 man-hour in normal time in zł	90	100	80	110	120
Cost of 1 man-hour overtime in zł	180	200	160	220	240
Fixed costs of the department in zł	60,000	60,000	90,000	80,000	120,000

6.4.3.2. Technical and economic parameters of products

Each product A, B, D and Z have determined following factors: unitary consumption of materials and work intensity of operations in departments that produce it. The order of operations is coherent with the information included in the table. It is important to notice that the material X can be used only in production of products A and B, and the material Y is strictly applicable to production of products D and Z. The table 6.9 presents the consumption of materials and man-hours for every product.

Table 6.9

Products – parameters	A	B	D	Z
Unitary consumption of materials in kg.				
X	50	45	–	–
Y	–	–	85	80
Unitary work intensity in man-hours				
A	–	–	10	8
B	5	4	–	–
C	–	5	10	–
D	4	–	–	12
E	4	6	10	10

Material supply

Every enterprise can purchase materials X and Y necessary for the production of products. The supply of materials is unlimited. Every enterprise can purchase any amount of materials. It is assumed that the purchase is being made on credit is charged interest equal0 paid after the sale of final products.

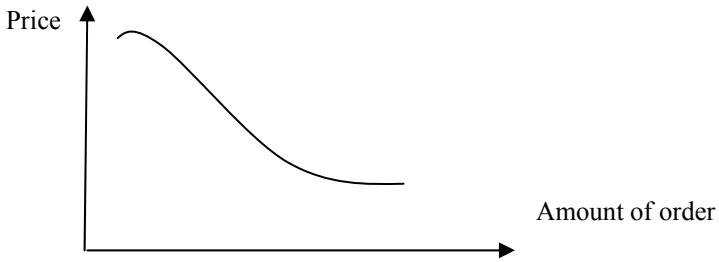
Every company is filing the demand for the purchase of materials to the moderator on the document No. 1 (purchase of materials).

Document 1

Purchase of materials for the company: …… kw ……				
Type of material	Amount in kilograms	Granted discount – ….%	Unitary price after the discount	Value
X				
Y				
Total				

The sale of materials takes place according to following principles:

- The minimal part of sale is 1000 kg of every material, it is possible to order the multiple of this amount (2000, 3000 kg);
- The selling price of the minimal batch of material amounts for product X equals 50 zł/kg and for Y – 60 zł/kg;
- The higher is the order (the greater is the multiplicity of the minimal party) the higher is the discount given by the seller;
- Participants of the game don't know the amount of the discount; however there is a discount barrier that participants don't know.
- Enterprises can purchase an expert opinion concerning shaping of discounts in individual quarters.



ATTENTION!! The described graph is ideologically visualizing the relation of magnitude of the part of materials from the price

Enterprises can sell to each other dispensable stocks of materials; all the more not used provisions of materials are causing addition storage costs (included in costs of the current quarter) in height of 20% of prices of purchase. After signing a suitable agreement, one enterprise can make an order for own demands and demands of other firms, in purpose of obtaining optimization of costs. The sale between enterprises requires a particular sale contract that companies prepare on their own and they make two exemplary of this contract (document No. 2).

Document 2

Contract of sale of materials Enterprise…… ….. kw….			
Type of materials	Amount in kg	Unitary price	Value
X			
Y			
Total			

Enterprises can sale to themselves production capacities on similar principles, in accordance to a price that has been negotiated between (document No. 3.)

Document 3

Contract of sale of man-hours Enterprise…….. kw……			
Department	Amount according to rbg	Unitary price	Value
A			
B			
C			
D			
E			
Total			

6.4.4. Final product demand

The enterprise can produce any number of products within the limits of its manufacturing capacity and material supplies. The produced output can be offered for sale as entity or in parts. The output that hasn't been sold in determined quarter can be sold in the next one. Storing final products causes costs (included in costs of the current quarter) in height of 30% of prices obtained by the company, and if the determined enterprise is preserving the entire supply of final products(it sells nothing) the cost is 30% of the lowest price of determined product in current quarter (prices for the country).

There is a domestic and foreign demand on products A, B, D, Z. The demand is limited and changeable in particular quarters and participants of the game don't know it. However, certain tendencies occur:

– the absorbency of the market to all products is quarterly not smaller than 900 pieces;
– demand of domestic and foreign markets are comparable (but not equal);
– the demand for B products is more stable than to products A and D;
– the domestic demand is more changeable than the foreign demand;

The sale is held under the following procedure:

– teams offer individual products for sale, filling the sales document of final products in and they are giving it to the moderator (document 4);
– the team determines from above the number of products offered for sale on the Polish and foreign market and products not sold in previous quarters (counting the price as the weighted average);
– products are being sold on the domestic and foreign stock-market, during which moderator (representing the stock exchange) is buying products for the minimum price for using the demand up.

Document 4

Sale of final products on the stock-market. Enterprise…… Kw…….						
Domestic market				**Foreign market**		
Products	Offered amount	Unitary price	**Purchased amount**	Offered amount	Unitary price	**Purchased amount**
A						
B						
D						
Z						

The team can buy an expert opinion concerning the intensity of demand. Products that haven't been sold in determined quarter can be offered In the next one. Still, it is important to remember that products that have benn offered on the domestic market must be offered again in the country (similarly with the foreign market)

6.4.5. Expert opinions

In every quarter decisions concerning following aspects are being taken:
- size of purchases of materials;
- size of trade of unnecessary materials;
- magnitude of the manufacturing capacity and their price;
- purchase of materials and of manufacturing capacity;
- size of production of particular products;
- magnitudes of the domestic and foreign offer;
- price offered on the stock-market;

Current quarterly decisions should be taken on the basis of analysis and strategic decisions at the beginning of the game and basing on information coming in systematically. Strategic decisions can concern following issues:
- what to produce and what to sell (all products? selected products only?)
- on which markets to sell?
- with who to cooperate?
- with who to compete?
- how to divide the responsibility?

Some decisions can be prepared rationally on basis of the information included in the description of the game. Other decisions require the purchase of expert opinions or acting in conditions of the great risk, not to say about uncertainty. Following expert opinions are offered in the beginning of each quarter (table 6.10):

Table 6.10

Type of expert opinion	characteristics	cost
Purchase of the specific amount of material	100% of certitude	30,000
Function of price of purchase of materials depending from the size of the order	100% of certitude	90,000
Prognoses of demand for 1 product in the quarter	95% of certitude	40,000
Prognoses of demand for 1 product in all quarters	95% of certitude	100,000
Prognoses of demand for all products in 1 quarter	95% of certitude	80,000
Prognoses of demand for all products in all quarters	95% of certitude	340,000

6.4.6. Organization and rules of the game

The ForMarket game has been worked out for a period of one year (4 quarters). Before beginning of the game, the moderator is dividing participants into teams (enterprises), which determine their names that will be unchangeable until the end of the game. Teams are choosing the leader of the group and the organization of work in the organizational structure.

In the first quarter the appropriate phase of the game includes:

1. Establishing the organizational structure of the enterprise;
2. Division of tasks;
3. Analysis and making strategic decisions;
4. Making decisions concerning the purchase of materials and presenting offers of purchase of materiale to the moderator;
5. Eventual additional purchase/sale of materials and manufacturing capacity after conducting negotiations and signing appropriate documents;
6. Drawing up the production program;
7. Preparing the sale offer on documents;
8. Presenting offers;
9. Sell exchange (only the moderator initiates those actions);
10. Setting the financial result (document 5)

There is about 150 minutes of time for playing the first quarter. Next quarters don't include presented first three points and the time for their realization equals about 110 minutes.

After setting the financial result of the last quarter and announcing the order of teams discussion is held. Representatives of enterprises are presenting results of taken decisions, analysis of mistakes and recommendations for future actions. Participants of the game are preparing a report of the course of the game including all taken decisions.

Document 5

Production in pieces		**A**	**B**	**D**	**Z**	
1.	Reserves from previous quarter					
2.	Current production					
3.	Total sale (from the document 4)					
4.	Current reserves (pos. 1+2+3)					
materials				X	Y	
5.	Reserves from previous quarter					
6.	Purchase (from the document 1+2)					
7.	Usage					
8.	Current reserves (pos. 5+6-7)					
Material costs				X	Y	
9.	Cost of purchase of materials (doc. 1+2)					
10.	Cost of storage of material reserves (pos. 8 x price from the doc. 1x 0,2)					

Costs in departments		A	B	C	D	E	Total
11.	Cost of work in normal hours						
12.	Cost of work in overtime hours						
13.	Cost of purchase of manufacturing capacity (doc. 3)						
14.	Fixed costs						
Cost of storage of final products		A	B	D	Z	Total	
15.	Cost of storage of final products (pos. 4x price from doc. 4x0,3)						
16.	Costs of expert opinions						
17.	Costs in total, pos. 9+10+11+12+13+14+15+16						
Incomes							
18.	Income from the sale of final product on domestic and foreign market (doc. 4)						
19.	Income from sale of materials(doc. 2)						
20.	Income from sale of production capacity (doc. 3)						
21.	Export bonus (value of foreign sale from doc. 4 x 0,3)						
22.	Total income, pos. 18+19+20+21						
23.	Financial result in the current quarter pos. 22-17						
24.	Financial result in cumulative terms						

6.4.7. Limitations

The maximum value of the product cannot be higher than total costs of production of this product increased about 100%. The minimum price cannot be lower than total unitary costs. A company can have imposed a penalty of 500,000 zł for applying corrupt practices.

6.5. Simulation of conflicts

Dynamic psychodrama – simulation live – it is exploiting current organizational and personal experience of participants.

Requirements: secluded conference room with the multimedia equipment, time: 8–20 hours of work in teams, number of participants: 8 – 16.

Workshop schedule:

1. Making participants of the simulation aware of the course of organizational conflicts.
2. Getting acquainting with the model of conflicts' escalator.
3. Finding features /indicators/ that describe best particular phases/stages for trained organization.
4. Determining weights for characteristics established in trained groups.
5. Assigning weighed features to distinguished groups in the organization.

6. Acquainting participants of the training with methods of solving conflicts at individual stages of the escalator of conflicts.
7. Designing situations of conflict possibly similar to organizational reality.
8. Assigning roles to participants and signing a contract determining penalties for breaking it.
9. Entering into roles and playing the psychodrama along with the selection.
10. Discussing the strategy of playing the psychodrama, work on emotions according to the approach of the system psychotherapy school. Showing crucial moments. Analysis of achieved results and the selection of methods.

Conducting the simulation of conflicts according to the presented plan allows to:

- Upgrade the level of knowledge and cognitive values of persons participating in the training.
- Create a possibility of building unofficial bonds in the trained group and raising its morality.
- Express emotions: negative, but also positive, concerning the problem being under discussion. It allows the moderator to build a „map" of emotions in the organization.

Bibliography

Abt S., *Logistyka nowym wyzwaniem dla metod symulacyjnych*, in: Symulacja Systemów Gospodarczych w Symulacja Systemów Gospodarczych, 1997.

Amabile T.M., *Creativity in context*, Westview Press, Boudler, 1996.

Balawajder K., *Konflikty interpersonalne, analiza psychologiczna*, Prace Naukowe Uniwersytetu Śląskiego w Katowicach, nr 1282, Katowice 1992.

Balcerak A., *Gry symulacyjne serio – w poszukiwaniu "typu idealnego"*, Szkoła symulacji Systemów Gospodarczych, Warszawa 2001.

Balcerak A., *Patrząc w przyszłość gier kierowniczych*, Symulacja Systemów Gospodarczych Antałówka'98, Wyd. Wyższa Szkoła Przedsiębiorczości i Zrządzania, Politechnika Wrocławska, Warszawa 1998.

Balcerak A., Pełech A., *Nanomodele symulacyjne – zarys pomysłu*, in: Symulacja Systemów Gospodarczych [Simulation of economic systems], Antałówka 1997.

Balcerak A., *Praprzodkowie gier symulacyjnych [Primogenitors of simulation games],* Szkoła Symulacji Systemów Gospodarczych, Antałówka 1997.

Balcerak A., *Realizm w menedżerskich grach symulacyjnych*, Metody Symulacyjne w badaniu organizacji i w dydaktyce menedżerskiej, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2008.

Balcerak A., *Rodzaje gier menedżerskich. O rubieżach klasyfikacji [Types of managerial games. About frontiers of classification]*, Modelowanie symulacje systemów społecznych i gospodarczych, Prace Naukowe Instytutu Organizacji i Zarządzania Politechniki Wrocławskiej, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2007.

Balcerak A., *Symulacja we wspomaganiu i badaniu uczenia się*, Modelowanie symulacyjne systemów społecznych i gospodarczych, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2006.

Balcerak A., *Walidacja operacyjna dydaktycznych gier kierowniczych*; [in:] *Symulacja Systemów Gospodarczych [Simulation of eco economic systems]. Prace Szkoły Antałówka'2000;* WSPiZ, Warszawa 2000.

Balcerak A., *Zorganizowana refleksja. Sens, forma i przebieg podsumowania rozgrywki gry symulacyjnej*, Symulacja systemów społeczno-gospodarczych [Simulation of socio-economic systems], Prace Naukowe Instytutu Organizacji i Zarządzania Politechniki Wrocławskiej, Wrocław 2005.

Bielecki W.T., *Efektywność symulacyjnych gier menedżerskich w porównaniu z innymi metodami kształcenia*, Symulacje Systemów Gospodarczych, Antałówka 1999.

Bielecki W.T., *Przedsiębiorczość w wirtualnym środowisku* Aspekt dydaktyczny. Wydawnictwa Naukowe Wydziału Zarządzania UW, Warszawa 1999.

Cameron J. and Pierce W. D., *Reinforcement, Reward, and Intrinsic Motivation: A Meta-Analysis,* Review of Educational Research, vol. 64, 1994, pp. 474-482.

Coleman M., DeLeire T. An Economic Model of Locus of Control and the Human Capital Investment Decision; [in:] *Journal of Human Resources* 2003/38(3), pp. 701-721.

Csiksztenmihalyi M., Cretivity [in:] *Flow and the psychology of discovery and invention*, Harper Colins Publ., New York 1996.

Czerniawska B., *Motywacyjne problemy zarządzania,* Państwowe Wydawnictwo Naukowe, Warszawa 1980.
Drabik E., *Zastosowanie teorii gier w ekonomii i zarządzaniu*, Wydawnictwo Szkoły Głównej Handlowej, Warszawa 2005.
Feigenbaum, E., *A Personal View of Expert Systems: Looking Back and Looking Ahead*. Knowledge Systems Laboratory, Apri, 1992.
Forte A., *Locus of Control and the Moral Reasoning of Managers*; [in:] *Journalof Business Ethics* 2005/ 58; pp. 65-77.
Freud Z*., Poza zasadą przyjemności [Apart from the pleasure principle]*, Państwowa Izba Wydawnicza, Warszawa 1973.
Fritchie R., Leary M., *Konflikty w przedsiębiorstwie,* Petit, Warszawa 1999.
Gadiesh O., Olivet S., *Projektowanie pod kątem możliwości realizacji,* w: *Organizacja przyszłości*, ed. F. Hesselbein, M. Goldsmith, R. Beckhard, Business Press, Warszawa 1998.
Gąsiorowska A., *Człowiek jako ofiara symulacji*. in: Symulacja Systemów Gospodarczych, Antałówka'98, Warszawa 1998.
Gościński J., *Zarządzanie praktyczne*, Zarządzanie, 1987, nr 8.
Holstein-Beck M., *Być albo nie być menedżerem*, Infor, Warszawa 1997.
Janowicz R., *Metody decyzyjne*, http://www.pentor.pl/17582.xml/ 01.12.2009.
Kaczmarczyk St., *Badanie Marketingowe. Metody i techniki*, Państwowe Wydawnictwo Ekonomiczne, Warszawa 1994.
Kisielnicki J., Sroka H., *Systemy informacyjne biznesu*, Agencja wydawnicza – Placet, Warszawa 1999.
Komorowska J., *Uczłowieczanie małpy*, Wiedza i życie, nr 6, 1997.
Koontz H., Weihrich H*., Essentials of Management*, New York 1990.
Kozielecki J., *Koncepcje psychologiczne człowieka Human psychological conceptions]*. Wydawnictwo „Żak", Warszawa 1995.
Kozielecki J., *Psychologiczna teoria decyzji,* Państwowe Wydawnictwo Naukowe, Warszawa 1975.
Kozielecki J., *Transgresja i kultura*, Wydawnictwo akademickie Żak , Warszawa 1997.
Koźmiński A.K., *Decyzje. Analiza systemowa organizacji*, Wydawnictwo Naukowe PWN, Warszawa 1979.
Koźmiński A.K., Piotrowski W., *Zarządzanie. Teoria i praktyka*, PWN Wydawnictwo Naukowe, Warszawa 2002.
Kujawińska A., Więcek-Janka E., *Statystyka matematyczna*, Wydawnictwo Politechniki Poznańskiej, Poznań 2010.
Kupisiewicz Cz., *Podstawy dydaktyki*, Państwowe Wydawnictwo Naukowe, Warszawa 1984.
Latawiec A., *Za czy przeciw symulacji świadomości*?, Symulacja Systemów Gospodarczych, Antałówka'97, Warszawa 1997.
Łukasik A., *Zewnętrzna ograniczenia procesu twórczego*. Wydawnictwo WSP, Rzeszów 1999.
Mantura W., (ed.) *Marketing przedsiębiorstw przemysłowych*, Wydawnictwo Politechniki Poznańskiej, Poznań 2000.
McClleland D.C., *The achieving society*, Princeton, New York 1961.
Mikołajczyk. Z., *Techniki organizatorskie w rozwiązywaniu problemów zarządzania]*, PWN Wydawnictwo naukowe, Warszawa 2001.

Mulawka J.J., *Systemy ekspertowe*, Wydawnictwo Naukowo Techniczne, Warszawa 1996.
Nelson E.S., Mathia, K.E., *The Relationships among College Students' Locus of Control, Learning Styles, and Self-Prediction of Grades*; [in:] *Education Research and Perspectives* 22(2); 1995, p. 110-117.
Nęcka E., *Psychologia twórczości*, Gdańskie Wydawnictwo Psychologiczne, Gdańsk 2002.
Nosal Cz., *Umysł menedżera. Problemy – decyzje – strategie*, Wrocław 1993.
Obuchowski K., *Psychologia ludzkich dążeń,* Państwowe Wydawnictwo Naukowe, Warszawa 1972.
Okoń W., *Słownik pedagogiczny*, Wydawnictwo Naukowe PWN, Warszawa 1981.
Osowski S., 1996, *Sieci neuronowe w ujęciu algorytmicznym*, WNT, Warszawa 1996.
Pełech A., Balcerak A., *Pojęcia i definicje do nanomodelowania symulacyjnego*, Szkoła Symulacji Systemów Gospodarczych Antałówka'99, Wyższa Szkoła Przedsiębiorczości i Zarządzania, Politechnika Wrocławska, Warszawa 2000.
Penc J., *Decyzje w zarządzaniu*, Wydawnictwo Profesjonalnej Szkoły Biznesu, Kraków 1997.
Piotrkowski K., Świątkowski M., Kierowanie zespołami ludzi, Dom Wydawniczy Bellona, Warszawa 2000.
Poundstone W., *Prisoner's Dilemma: John Von Neumann, Game Theory and the Puzzle of the Bomb,* Doubleday, New York 1992.
Pszczołowski T., *Mała Encyklopedia Prakseologii i Teorii Organizacji,* Zakład Narodowy im. Ossolińskich, Warszawa 1978.
Radosiński E,. Balcerak A., *Zabawa, wojna zarządzanie, Historia powstania i rozwoju gier kierowniczych,* in: (ed) Radosiński E., *Modelowanie symulacyjne w dydaktyce ekonomii [Simulation modeling in didactics of the economy]*, Polskie Towarzystwo Symulogiczne, Wrocław-Kraków-Gliwice, ss. 9-26.
Robbins S., *Zachowania w organizacji*, PWE, Warszawa 1998.
Rosenshine B., and Furst N., *Instructional conceptions: Analysis from an instructional design perspective* International Journal of Educational Research Volume 41, Issue 6, 2004, pp. 429-444.
Rotter J.B. 1990. *Poczucie wewnętrznej versus zewnętrznej kontroli*; [in:] Nowiny Psychologiczne 5/6; pp. 59-70.
Rudniański J., *Przed decyzją*, Państwowe Zakłady Wydawnictw Szkolnych, Warszawa 1965.
Rzońca W., *Znaczenie gier kierowniczych w kształceniu przyszłych menedżerów,* Symulacje systemów gospodarczych, Prace naukowe Instytutu Organizacji i Zarządzania Politechniki Wrocławskiej, Studia i Materiały, Wrocław 2003.
Sajkiewicz A., (ed.) *Zasoby ludzkie w firmie*, Poltext, Warszawa 2000.
Salen K., Zimmerman E., *The Game Design Reader A Rules of Play Anthology* 2005.
Scott W.J, Cummings L.L. ed., *Zachowanie człowieka w organizacji,* Państwowe Wydawnictwo Naukowe, Warszawa 1993.
Sikora J., Zarządzanie konfliktem w zakładzie pracy, Oficyna Wydawnicza Ośrodka Postępu Organizacyjn., Bydgoszcz 1998.
Sternberg R. J., Lubart T. I., *Defying the crowd* [in:] *Cultivating creativity in a culture of conformity*, Free Press, New York 1995.
Steward D., Praktyka kierowania, PWE, Warszawa 1997.
Stoner J., Freeman E., Gilbert D., *Kierowanie*, PWE, Warszawa 2001.
Straffin P.D., *Teoria gier*, Wydawnictwo Naukowe Scholar, Warszawa 2004.

Szczupaczyński J., *Anatomia zarządzania organizacja*, Wydawnictwo Międzynarodowej Szkoły Menedżerskiej, Warszawa 1998.
Tyszka T., *Analiza decyzyjna i psychologia decyzji*, Państwowe Wydawnictwo Naukowe, Warszawa 1979.
Warecki M., Warecki W., *Decyzje nasze codzienne*, Solidarność, nr 15, 11 kwietnia 2008.
Webber R.A., Zasady zarządzania organizacjami, Państwowe Wydawnictwo Ekonomiczne, Warszawa 1990.
Więcek-Janka E., Balcerak A., *Poczucie umiejscowienia kontroli u uczestników symulacyjnych gier kierowniczych. Badania wstępne*. Modelowanie symulacyjne systemów społecznych i gospodarczych [Simulation modeling of social and economical systems], Wrocław 2006.
Więcek-Janka E., Ciesielski A., *Symulacja w dydaktyce badań marketingowych*, Modelowanie symulacyjne systemów społecznych i gospodarczych, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2008.
Więcek-Janka E., *Dylematy Symulacji Konfliktów* in: Symulacja Systemów Gospodarczych [Simulation of economic systems], Prace Naukowe Instytutu Organizacji I Zarządzania Politechniki Wrocławskiej, Seria: Studia i Materiały nr 75/15, Wrocław 2003.
Więcek-Janka E., *Psychologia gier symulacyjnych*, Prace Naukowe Instytutu Organizacji i Zarządzania Politechniki Wrocławskiej, Seria: Studia i Materiały, Wrocław 2004.
Więcek-Janka E., *Zmiany i konflikty w organizacji*, Wydawnictwo Politechniki Poznańskiej, Poznań 2006.
Witkowski T., *Decyzje w zarządzaniu przedsiębiorstwem*, Wydawnictwa Naukowo-Techniczne, Warszawa 2000.
Zieleniewski J., *Organizacja zespołów ludzkich,* PWN, Warszawa 1978.
Zimbardo Ph., Ruch F., L., *Psychologia i życie*, Wydawnictwo Naukowe PWN, Warszawa 1994.
www.ioz.pwr.wroc.pl/13.12.2009/pietron
http://pl.wikipedia.org/wiki/Nagroda_Nobla#Historia

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